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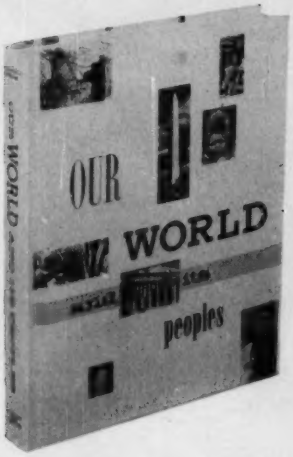

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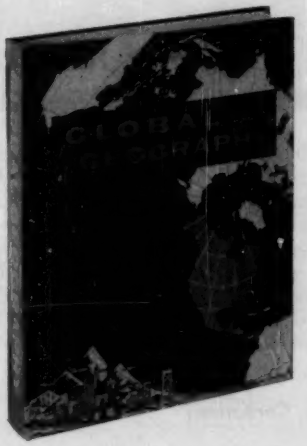

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SCOPE AND SEQUENCE OF GEOGRAPHIC EDUCATION IN THE MODERN SCHOOL CURRICULUM GRADES FOUR THROUGH TWELVE*

BERENICE M. CASPER
Trenton State College

Nature and Function of Geography

TODAY'S WORLD is dynamic, employing man's creativeness and ingenuity on a vast scale and utilizing the earth's natural resources at an amazing rate. In this world man lives in specific and varied localities, unique unto themselves, yet part of the grand mosaic of an interdependent and total world. Geographic analysis of these localities reveals that the peoples of the world are living at many different levels of well being and are faced with complex problems related to the uneven distribution of natural and cultural resources.

The unique function of geographic education is to provide the experiences through which young people recognize these regions and develop the accurate reasoning and sympathetic understandings necessary to solve the problems—social, economic, and political—which come from the inequalities of distributions on the face of the earth. From these experiences are developed geographic generalizations and skills essential to the creating of the geographical philosophy or point of view involved in the how and why of regional differentiation and regional interdependence. Thus, in the modern school curriculum, geographic education is assigned a major role in developing competent citizens aware of and understanding all of the peoples of the world as well as the role their own country plays in the interdependence of nations.

Even though there has been considerable effort during the past sixty years to establish criteria for the what and when of geographic education in the total educational program, the problem is currently an urgent one. The lack of a precise statement of (1) the geographic concepts and generalizations, (2) the understandings and attitudes, and (3) the basic skills which should be developed at each academic level from grades one through college is of grave concern both to the geography specialist and to the educational specialist.

The dynamic nature of geography necessitates the continuous evaluation of the geographic content of the curriculum for elementary and secondary schools. It is one of the functions of the geography specialist to apply and evaluate the changing content of geographic subject matter. It is the function of the educational psychologist to determine how and when children can best assimilate this content. It is the function of the curriculum consultant to organize the geographic experiences with continuity for the mastery of geographic facts and skills. It is the function of the teacher to help

* The writer is indebted to both A. J. Nystrom & Co., and to the Delta Kappa Gamma Society International for grants which made this study (a part of a doctorate dissertation) and publication possible.

the child acquire these fundamental geographic understandings and skills.

Research Techniques

This paper is a resume of a dissertation study, completed by the writer last year, which analyzed and synchronized the research and empirical judgments of investigators in these four closely related areas of educational practices.

The first step in the prosecution of the study was the classification and analysis of the literature and research in educational geography, in educational psychology, and in the theory of curriculum construction that were pertinent to the selection of the basic geographic content and the utilization of the characteristics of child growth and maturation in constructing a well-balanced and flexible curriculum guide. In order to utilize teacher experience, a questionnaire was devised and sent to teachers designated as competent in the teaching of geographic education by State Commissioners of Education, City School Superintendents, and professional geographers.

The Questionnaire

The 266 teachers responding to the questionnaire represented 149 city schools in 44 states, 5 provinces in Canada and the District of Columbia. They averaged 19.2 years of experience and had earned an average of 43.8 semester hours in Education and an average of 28.15 semester hours of Geography. Master's degrees were held by 53.4 per cent of the teachers; 37.4 per cent had Bachelor's degrees; and 6.69 per cent had earned Doctor's degrees.

Data Established

The questionnaire was designed to encompass four areas of the organization of the geography curriculum—(1) curriculum design, (2) the vertical sequence of the broad categories of systematic geography both physical and cultural and the order of regional studies, (3) the grade placement of geographic skills, and (4) the scope and sequence of selected geographic concepts and generalizations.

The curriculum design defined seven of the most commonly used ways of organizing the curriculum—geography as a separate field of study, geography as part of either integrated, correlated or fused social studies programs. Geography was also considered as a tool subject, as an integral part of the core curriculum plan, and as a part of an experience-centered curriculum. Elementary teachers thought geography was utilized most efficiently when used as an integrated subject in the social studies courses. Junior and senior high school teachers preferred geography taught as a separate subject whether required or elective.

Teachers were also asked to indicate the necessary amount of time per semester for each grade level. The time allotted for elementary geography was 150 minutes a week, or 50 per cent of the time allotted social studies. Junior and senior high school teachers preferred five periods a week for two semesters a year.

Systematic Geography. The second part of the questionnaire presented in outline form the essential elements of systematic and regional geography. This was based on the description of the field of geography by two well known geographers—Dr. Vernon C. Finch and Dr. Glenn T. Trewartha—and the detailed analysis of fifty-two selected courses of study and curriculum guides.

With few exceptions sixth and seventh grades were thought capable of understanding most concepts concerning the earth and both natural and cultural features inherent in systematic geography. The most simple descriptions of the earth and its motions were assigned fourth and fifth grades. All items, with the exception of inclination and parallelism of the axis, and equinoxes and solstices, were equally important in

grades four through seven. These exceptions were not to be introduced before grade six.

The simple descriptive concepts of climate such as temperature and precipitation statistics and types of climate were thought by less than 25 per cent of the teachers to be appropriate for fourth grade study. Surface features and earth resources with the exception of soils were to be introduced in grade four. Facts concerning soils, except for soil classification, were thought unimportant. The study of minerals was judged important only for the seventh grade. The more complex concepts of climate such as range of maximums and minimums and total amounts of precipitation and temperature were considered too difficult for grade four and received most emphasis in sixth and seventh grade.

Population analysis and statistics and house types and settlements were not considered important at any grade level. Agricultural production was thought suitable for grades six and seven; manufacturing was emphasized most in junior high school and in the tenth grade. In summary, teachers selected the observation and description of physical and cultural landscapes as the important functions of the elementary curriculum. The interpretation and utilization of such data were designated for the secondary school curriculum.

Regional Geography. Regional study sequences in the curriculum followed the typical scheme developed by many curriculum guides—geography of the home state or of "Far Away Lands" for the fourth grade; Anglo-America grade five; Latin America in grades six or seven, more often six; Eurasia, Africa, Australia, New Zealand and Oceania in grade seven. Global or world geography, economic geography and the United States in relationship to the rest of the world were most often suggested by the teachers for inclusion in the senior high school curriculum. Geography of the home state was also suggested for the eighth grade.

Geographic Skills. With few exceptions, most of the developmental skills involved in using geographic tools were placed at fifth, sixth and seventh grade levels. Fourth graders were thought capable of understanding map indices, map keys and symbols, road and route maps. They also could interpret the globe in location of continents, hemispheres and oceans, and with such locational items as circles, tropics, and the equator. Few teachers thought fourth graders were capable of using maps on field trips or making maps out-of-doors using natural materials.

Few skills were assigned for introduction only at the senior high school level with the exception of complex distribution maps such as contour and physiographic maps and map projections. Using two or more maps to establish geographic relationships and complex statistical forms such as block diagrams, cartograms and isopleth maps were also assigned to the secondary levels. The use of the analemma and of gnomonic map projections was thought too difficult for any grade level.

Several items were thought equally important at most grade levels. They were: inch-to-mile scale; use of map keys and symbols; weather, relief and contour maps; historical maps; using maps on field trips and locating places on maps. This was in line with the oft repeated comment that concepts should, after once being introduced, receive continuous study at increasingly difficult levels of use. Teachers gave most emphasis to the seventh grade for introducing most map skills and concepts. Fifth and sixth grades were also considered suitable for the formal introduction of many of the skills related to map reading.

Evaluation. Teachers were also asked to evaluate one hundred thirty-one con-

cepts and generalizations that elementary and secondary school students could be expected to understand and use in geographic education. This list was representative, not definitive, of the broad fields of geography. The evaluation of these types of relationships between the natural and cultural elements of geography proved most difficult for the teachers to rank as to grade placement. Here again they emphasized that the concepts in a very simple form could be studied in elementary grades. However, they always indicated the need for more sophisticated treatment in junior and senior high school as a child's ability to reason and comprehend developments. As a consequence very few of the items were checked for presentation in the elementary grades except the sixth grade. The analysis of this section of the questionnaire showed rather emphatically that teachers considered children unable to formulate and use relationships before the sixth grade and only then the most simple generalizations.

The generalizations concerned with the utilization of natural features, such as climate and land forms, in analyzing cultural patterns were considered suitable for the junior high school curriculum. The generalizations dealing with agricultural and manufactural industries, communication and transportation, utilization of forest products and minerals, textile industries and mechanization were also judged suitable for junior high school. The generalizations illustrating global concepts, military and political geography, urban geography, industrial location and production, and technological developments were assigned to senior high school curriculum.

The written comments accompanying the returned questionnaire showed much similarity in the teachers' thinking. The most frequent comment emphasized that concepts and generalizations could not be taught as discreet items at one exposure but should be developed through the use of many specifics over a period of many years. As more information is obtained by the child, relationships between the concepts will be more clearly understood and better insights will be achieved. Teachers also stressed that skills and concepts should be appropriate to the ability, interests, and maturity of the child. Yet teachers were most reluctant to make definite commitments as to grade levels appropriate for individual concepts. They were emphatic about the need for continuity in content and purpose of the geography curriculum for grades four through twelve.

They also stressed the need for a systematic plan for the total curriculum. They suggested that the readiness program initiated in the kindergarten-primary grades should be extended into the fourth grade. More formal or systematic geography then would not be introduced before the fifth grade. This is interesting because fourth and fifth grade teachers feel that the course content of these grades is over-loaded in the current courses of study and that much geography now suggested for their use should be delegated to both junior and senior high school courses of study. Place geography and field work was emphasized for all grades. The geographic technique of observing and recording data from the actual landscape was thought essential for elementary children. The more complex analyzing and generalizing of geographic relationships derived from the actual observations were reserved for the secondary schools. Teachers, at all levels, were in more accord when evaluating the sequence and grade placement of the use of geographic skills and tools.

Correlation of Data

The data developed from the opinions of superior teachers of geographic education were then substantiated and correlated with the theoretical and applied re-

search of the educational psychologist and educational geographer, prior to the construction of a recommended geography curriculum for grades four through twelve.

Since concepts of space and time are such integral parts of the whole field of geography the research in how children develop these concepts was carefully analyzed. The most recent clinical research (1956) done by J. Piaget and B. Inhelder shows that at the ages of nine and ten a decisive turning point is reached by the child in the development of spatial concepts. He has mastered the task of making a pictorial layout in regard to position and distance and perspective and proportions. The ability to utilize abstract coordinates doesn't develop until the student is twelve years of age. Since it is precisely the development of abstract operations which enables the child to understand maps and coordinate axes in his school work, the children of the eleven and twelve years age group tend to exhibit a combination of individually worked out and formally learned concepts. It is at precisely the same time that the child completes his understanding of time concepts, coordinating movements and speeds.

One other phase of research dealing with space and time concepts was investigated by the writer, that of the effectiveness of present methods used by teachers in helping children to understand and use these concepts. It would seem that teachers and curriculum consultants are correct in the grade placement of space and time concepts, but that results are not being achieved in the classroom commensurate with the abilities of children as described by Piaget and Inhelder and by Gesell and his associates. Teachers evidently do not know how children structure time and space concepts and therefore do not provide the appropriate experiences to insure the development of these concepts.

Research also suggests that the ability to do conceptual thinking is rather well established by the twelfth year. This can be enhanced by specific instruction in logical thinking. At this age the child can attempt abstract definitions and plan organization of materials. He can use problem-solving techniques in understanding generalizations and relationships.

Educational Objectives

Educational objectives in the modern school curriculum are well established in precedent and function. Geographic education is implicit in such objectives as: the knowledge of the interdependence of the world, both between peoples and groups, the understanding of the technological development of economic production, the effective use of resources and materials, the dependence of man on his understanding and control of the physical environment, the relationship of man's physical environment to his way of living, the use of the principles of democratic living, the development of skills and techniques of scientific method and geographic tools. To a great degree these concepts and generalizations, these tools and techniques, these attitudes and understandings are complex, difficult and need a high degree of maturity for effective utilization by the individual student.

Recommendations

To achieve these objectives the following recommendations are made:

Every school system should have a comprehensive and detailed curriculum guide showing a well-planned continuity and content of geographic education for grades one through twelve regardless of the type of curriculum organization adopted by the school. This guide should be tailored to the needs of each locality and should result from the concerted action of classroom teachers, curriculum consultants and geography specialists.

More attention should be paid to the maturity and interests of children at each of the grade levels in the determination of curricular content of concepts and skills. It should also be kept in mind that the dynamic nature of geographic education requires constant evaluation and implementation of changing curricular content.

Further, it is recommended that geographic education be used at every grade level in the elementary and secondary schools. If not taught as a separate subject in the secondary school, the concepts and generalizations, the understandings and attitudes, and the skills of geographic education should be specifically defined for use in related subject matter fields.

The overcrowding of the elementary curriculum should be alleviated by continuing the geography readiness program of the primary grades through the fourth grade. The fifth and sixth grades should be concerned with the study of regional geography of Anglo-America. Regional geography of Latin America and/or Eurasia, Africa and the Pacific Islands could then be studied in either seventh or eighth grades depending on the needs of the school as determined by law or objectives of the individual states. With the exception of the repeating of the study of the United States in either eighth or ninth grade, the one-cycle approach is recommended to relieve unnecessary repetition. The senior high school geography courses should be concerned with global aspects of geography—physical, economic and political. These should emphasize the status of the United States in the international affairs of the world today.

Summary

Four areas of research are recommended for geographers and psychologists. The grade placement of concepts and generalizations should be standardized by scientific statistical procedures. The judgment of competent teachers does not seem adequate. Knowledge of the manner in which children acquire and develop time and space concepts is inadequate and lacking in explicit applications to curriculum construction. This is also true for the way in which children form concepts and generalizations and for the manner in which critical thinking is developed. More research is needed to determine the effectiveness of geographic education when used in integrated and correlated social studies courses.

When these areas of scientific research are completed geographers can speak with more authority concerning the modern school curriculum.

SIKKIM AND BHUTAN: A GEOGRAPHICAL APPRAISAL*

PRADYUMNA P. KARAN
University of Kentucky

ALONG THE SLOPES of the Himalayas, adjoining Communist-occupied Tibet, lie two of the world's least-known kingdoms—Sikkim and Bhutan (Fig. 1). Completely screened by nature and secrecy, both have remained remote, closed lands whose rulers actively discouraged foreign visitors and foreign ways. Few Europeans and Americans have been in Bhutan and Sikkim, and fewer still have seen the interior.

Now all this is changing. The Tibetan

* This study was supported by the University of Kentucky Faculty Research Fund. With the aid of research grants from several agencies, a brief reconnaissance trip was made to the area in 1957.

revolt, the flight of the Dalai Lama[1] to freedom in India, and the Chinese claim on the Himalayan territories of India, Nepal and Bhutan have focused the imagination of millions who would have been hard put to locate Sikkim and Bhutan on a map. The Chinese threat is responsible for a crash program of road construction and economic development in both Sikkim and Bhutan which will open these formerly inaccessible areas. A new road has already brought the tourist age to Sikkim,[2] and in June 1960, for the first time, an American correspondent was allowed to visit Bhutan.[3]

Geographers and others have described, at least in broad outline, the western Himalayas in Kashmir, Punjab and Uttar Pradesh; central Himalayas in Nepal, and eastern Himalayas in Assam,[4] but very little is known about strategic Sikkim and Bhutan Himalayas, which control gateways from Tibet to the densely populated lower Ganges Valley. With the rest of the Himalayas, Sikkim and Bhutan, form a front line in India's bitter border dispute with Communist China.[5] The brief geographical sketch of Bhutan and Sikkim presented here may therefore be of current interest and a worthwhile addition to their limited published material.[6]

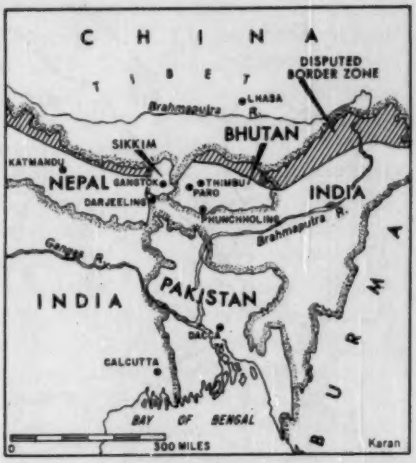

FIG. 1. Sikkim and Bhutan: Location Map. Shaded areas are in dispute with China.

Bhutan is a semi-independent kingdom guided by India in its external relations; Sikkim to the west, separated from Bhutan by the narrow Chumbi Valley

[1] Verrier, Elwin, "The Dalai Lama Comes to India," *Geographical Magazine*, Vol. 32, No. 4, 1959, pp. 161-169.

[2] See articles in the 6-page, "Sikkim: A Statesman Supplement" issued with the *Statesman* (Calcutta), June 2, 1960; "India Pressing Sikkim Progress," *New York Times*, January 6, 1960. See also *Sikkim Looks Ahead*, Publications Division, Indian Ministry of Information and Broadcasting, Delhi, 1956, 48 p. For historical and physical background see *Gazetteer of Sikkim* with an introduction by H. H. Risley, edited in the Bengal Government Secretariat, Bengal Secretariat Press, Calcutta, 1894, 392 p., 21 plates, 2 maps.

[3] See three illustrated articles and a picture report on Bhutan by Paul Grimes, correspondent of the *New York Times* in India who visited Bhutan in June, 1960; *New York Times*, June 13, 14, 15, 1960.

[4] References to the major scholarly works on the Himalayas are given in O. H. K. Spate's *India and Pakistan*, E. P. Dutton and Company, New York, 1957. For Nepal Himalaya see Pradyumna P. Karan (with W. M. Jenkins), *Nepal: A Physical and Cultural Geography*, University of Kentucky Press, Lexington, Kentucky, 1960.

[5] Pradyumna P. Karan, "The India-China Boundary Dispute." *Journal of Geography*, Vol. 59, No. 1, January, 1960, pp. 16-21.

[6] A survey of thirty volumes of the twenty-five leading American, European and Asian geographical journals revealed one study on Bhutan and only three papers dealing with Sikkim: F. M. Bailey, "Bhutan, a Land of Exquisite Politeness," *Geographical Magazine*, Vol. 1, No. 2, 1935, pp. 85-97; "Sikkim," *Indian Geographical Journal*, Vol. 19, No. 1, 1944, pp. 41-48; Jacques Dupuis, "Le Sikkim," *Acta Geographica* Societe de Geographie, Paris, Fasc. 29, Mars, 1959, pp. 19-29; Bireswar Banerjee, "Some Preliminary Observations on the Geomorphic Features of a Part of Eastern Sikkim: Chaangu-Natu La-Bidang Lake," *Geographical Review of India*, Vol. 17, No. 3, September 1955, pp. 23-30. The lack of research interest shown by geographers in Bhutan and Sikkim Himalaya appears to be compounded of several factors: (1) the relative isolation, inaccessibility and absence of transportation facilities within the area, (2) political difficulties in securing permission to enter and stay over a longer period in the region, and (3) lack of modern maps and statistical data concerning Bhutan.

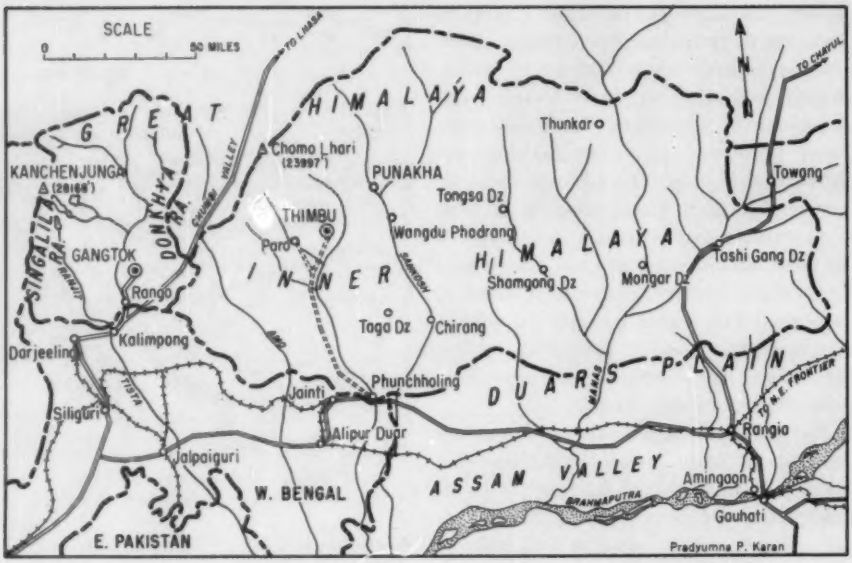

FIG. 2. Sikkim and Bhutan: Physical divisions, drainage and transportation. (Base map by Survey of India.)

promontory of Tibetan territory, is by a 1949 treaty a protectorate of India. Often Sikkim and Bhutan are listed incorrectly along with Nepal as independent states.[7] In size their combined area is about one-quarter larger than Switzerland, but, individually, Sikkim (2,818 sq. mi.) is approximately one-third the size of New Jersey, and Bhutan (18,000 sq. mi.) only one-half the area of Indiana. Together, the population of Sikkim (137,725) and Bhutan (700,000) is as large as that of Rhode Island.[8] The average density of the two kingdoms is about 40 people per square mile, considerably less than that of adjacent Nepal (150 per sq. mi.). Sikkim is more heavily populated with a density of 48 as compared with Bhutan's 38 persons per square mile.

[7] For example, Bhutan is listed as "fully independent" along with Nepal in George B. Cressey, *Asia's Land and Peoples*, McGraw-Hill Book Company, New York, 1951, p. 411.

[8] Population of Sikkim as given in report of the Census of India, 1951; the figure for Bhutan is estimated. The present population of Sikkim is estimated at 150,000.

The Physical Setting

Sikkim is essentially an enclosed basin, nearly 40 miles wide, between two deeply dissected north-south transverse ridges, each of them about 80 miles long. The western ridge, the remarkable Singalila Ridge, marks the boundary with Nepal and includes the peak of Kanchenjunga (28,168 feet) and to the east the crest of the Donkhya Range forms the boundary with Tibet. To the north the central basin is cut off from Tibet by the broad convex arc of the Great Himalayan peaks built up of a crystalline complex of gneiss and schist, in which the River Tista rises. To the south it is blocked by the resistant gneissic Darjeeling Ridge (in India) through which the Tista has carved a deep narrow gorge to the west of Kalimpong (Fig. 2). This extensive bowl-like, mountain-girdled basin has been formed by the erosive work of Tista and its tributaries such as Ranjit. Structurally, the Tista basin is "inverted," occupying the axis of an enormous over-

folded anticline,[9] the core of which is represented by the Kanchenjunga. The fierce dissection of the Sikkim Himalayas has been facilitated by excessive rainfall (nearly 200 inches annually) from the uninterrupted sweep of the moisture-laden southwest monsoon, due to its location immediately opposite the alluvial gap between the hills of northeastern Peninsular India and the Shillong Plateau of Assam. This has enabled the rivers (Tista and its feeders) to deeply dissect the highlands underlain by softer slates, phyllites and mica schists of the Daling Series. In this way, instead of a narrow gorge, a large basin about 40 miles wide has been cut back through the structurally weaker and less resistant crestal part of the anticlinal axis of the highlands.

Physically, Bhutan extends from the sub-Himalayan Duars plain to the south to the Great Himalaya to the north. It can be divided into three major topographic units. (Fig. 2). First, along the southern fringe bordering the Indian states of West Bengal and Assam is the rolling Duars plain made up of sandy and gravelly material. It varies in width from 10 to 15 miles but narrows considerably in certain sections. The second unit, the rounded mountains of the Inner Himalaya (between 5,000 to 10,000 feet) comprising a 40 to 50 mile wide zone, rises steeply from the Duar country. This zone is dissected by a series of longitudinal gorges carved out by rivers rising in the Great Himalaya. Several fertile valleys, including the Paro Valley—the heart of the country—lies in this region (Fig. 4). Most of these intensively cultivated valleys, at altitudes between 5,000 to 7,000 feet, contain the bulk of Bhutan's population. The third physical unit —the Great Himalaya—consists of rugged mountains rising above perpetual snow. This zone is about 10 miles wide and in the northwest is dominated by the imposing peak of Chomo Lhari (23,997 feet). The Great Himalayan region is uninhabited except for scattered Buddhist monasteries in the narrow, rough and stony mountain valleys.

Both in Sikkim and Bhutan climate and vegetation change with elevation, slope and exposure. From the region of alpine tundra and perpetual snow in the Great Himalaya, one passes through additional temperate belts down to the sweltering Duar plain in southern Bhutan, and hot, steamy valleys of lower Sikkim. Three climatic regions can be distinguished in Sikkim and Bhutan Himalaya. Up to an elevation of 3,500 feet in the valleys and Duars plain the climate is fully humid sub-tropical with heavy rainfall. Between 3,500 and 7,500 feet the winters are cool and the summers are warm (often hot) and rainy with excessive precipitation on the south-facing slopes of the mountains.[10] This zone—the tierra templada of the Himalayas—is the most important from the viewpoint of settlement and agriculture. Between elevations 7,500 and 13,500 feet there is a succession of undifferentiated microthermal climates with vertically arranged belts of moist temperate forests, rhododendrons, and alpine meadows. Beyond 13,500 feet there is a permanent snow-cover with glaciers descending to lower levels in some areas.

Land Use and Rural Settlement

There is little data concerning the distribution of land in Sikkim and Bhutan among agricultural, grazing and forestry, and waste and barren areas, The generalized land use map (Fig. 3), based on field reconnaissance, gives some idea of the proportion of land utilized for crops, the amount of land covered by alpine

[9] Edwin H. Pascoe, *A Manual of the Geology of India and Burma*, Manager of Publications, Government of India, Delhi, 1950, p. 318.

[10] For example, Gangtok receives 133 inches, Gnotong, on the Donkhya Range, 180 inches yearly. O. H. K. Spate, *India and Pakistan*, E. P. Dutton, New York, 1957, p. 417.

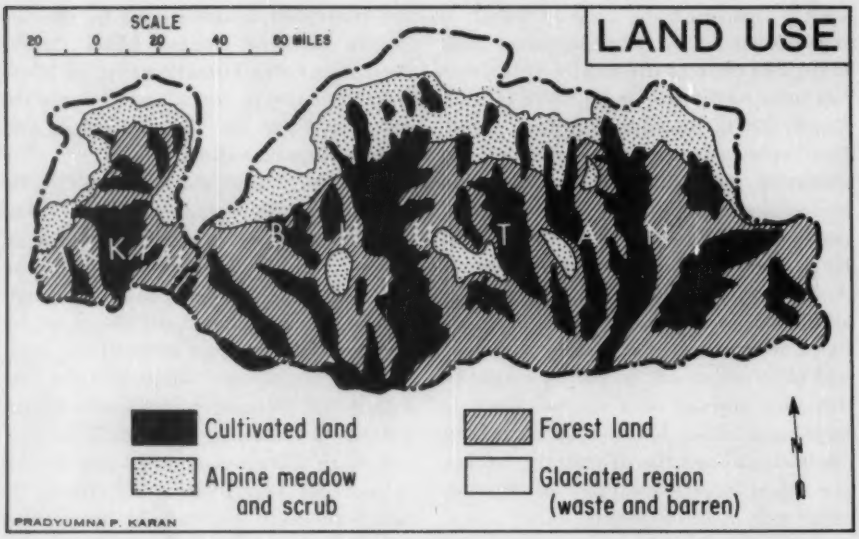

Fig. 3. Sikkim and Bhutan: Land Use Pattern. (Based on field reconnaissance.)

meadows and forests, and the extent of waste and barren glaciated areas.

The land use map reveals a major concentration of cultivated land in the warm and moist southern section of the Tista basin. In this lower part of Sikkim an extended monsoon and heavy rainfall permit the cultivation of two or three crops per year. The chief crops are rice and tea. In the areas of shifting cultivation millets and buck wheat are grown.

In Bhutan the cultivated land occurs in widely scattered patches in the Inner Himalayan valleys—such as the famed Paro Valley (Fig. 4). Agriculture is characterized by small terraced fields, primitive implements, and an intensive subsistent type of rural economy in which rice is the leading crop. Wheat, barley and millet are also grown. At higher altitudes, mostly between eight and ten thousand feet, the climate is colder and only potatoes and barley are grown in the valleys. Both in Sikkim and Bhutan land presently under cultivation includes upland areas which, from an ecological and topographical standpoint, should be under grass or forest.

Most of the forests of Sikkim and Bhutan are located in the Inner Himalayas and Duars plain. Generally, open forests of birch and oak predominate in most areas with dense concentrations in inaccessible regions. In the Duars plain of Bhutan there are tropical and sub-tropical forests of *sal* and *chir* pine. In many areas forests have been burned in the destructive practice of shifting agriculture. Both forests and other uncultivated lands are closely grazed in Sikkim and Bhutan, and it is difficult to show grazing land separately on the land-use map. The Himalayan region below the snow line contains good alpine meadow but owing to its topographical position its use for pasture is limited.

Most of the waste lands lie in the Great Himalaya above 13,500-14,000 feet. Here, the mountains rise into snow-capped peaks and, because of the rugged terrain and severe climate, these lands are practically barren and useless.

In both Sikkim and Bhutan the population is distributed among the countless smaller valleys and the settlement pattern is essentially dispersed in hamlets of four

FIG. 4. A view of the intensively cultivated Paro Valley, about 7,000 feet above sea level. This landscape is representative of the fertile valleys in Bhutan's Inner Himalayan Region. The valley's crops are rice, wheat, barley and millet. The building in the center is the state guest house, others form part of Buddhist chapel. (Photograph by the *New York Times*.)

or five farmsteads. The productive land is limited to clearings in the narrow, rugged mountain valleys, and the farmer usually builds his house on the lower slope above the cultivated land. Agglomerated settlements in the form of small rural villages, with about 15-20 houses, are found in the Great Himalaya and the upper section of the Inner Himalayan region. Here, the scarcity of land, level enough for building and cultivation, and the need for protection against the danger of avalanches and landslides encourage the clustering of dwellings, often around a monastery which serves as the nucleus of the Himalayan village.

Boundary Problems

Except for the Chumbi Valley area, the traditional boundary of both Sikkim and Bhutan tends to follow the readily recognizable watershed range which sometimes lies to the north of the line of the high Himalayan peaks. Sikkim's frontier with Tibet was defined by the 1890 treaty between China and Britain which then controlled the state. The first article of this agreement states that the "boundary of Sikkim and Tibet shall be the crest of the mountain range separating the waters flowing into the Sikkim Teesta and its affuents from the waters flowing into the Tibetan Mochu and northward into

the other rivers of Tibet." It seems that Communist China recognizes this agreement. So far, China has advanced no territorial claims on Sikkim, although heavy concentrations of Communist troops have been reported along the Sikkim frontier.[11]

The Tibet-Bhutan boundary is undefined. Here the customary boundary follows the crest of the Great Himalayan Range which is also the watershed in this section, but China does not recognize this traditional watershed boundary as valid. The Chinese claim (Fig. 1) about 300 square miles of northeastern Bhutan and a substantial area to the north of Punakha (Fig. 2), the old Bhutanese capital.[12] The Chinese territorial claim on Bhutan is based mainly on ethnic similarity with Tibet. No incursion of the Chinese troops across the Bhutanese border has been reported, but Tibetan trade, especially the export of Bhutan's surplus rice to Tibet, has completely stopped due to a border dispute, causing great economic suffering to the Bhutanese farmers.

In the Bhutan Himalayas, people have settled up to the water-parting of the rivers and, since ancient times, the watershed range has served to separate the sphere of influence of the Bhutanese principality from the northern Tibetan tribes. The watershed range (the crest of the Great Himalaya) has thus evolved in Bhutan as the frontier with Tibet through settlement, custom, and tradition. The use of the watershed range as boundary in the Himalayas has considerable support in history. Discussing the Himalayan boundaries, the preface to the report of the Pamir Boundary Commission (1895) states that "geographically, politically, and ethnographically watersheds . . . are the only true and stable boundaries in these region . . ., the possession up to the headwaters of each system by one people constitutes the only frontier that has survived the lapse of time."[13] A joint survey by India and China of the watershed range to demarcate the border would be a satisfactory solution of the Bhutan-Tibet boundary problem.

Recent Developments

A major transformation is stirring in the remote highlands of Sikkim and Bhutan as two Himalayan kingdoms struggle to modernize in the face of Communist aggression along their Tibetan frontier. Militarily, both are vulnerable and could be a gateway to the Indian plains if Chinese Communist aggression spreads. Aware of this fact, India is rushing troops and arms into Sikkim and Bhutan, and speeding the construction of roads, particularly into the northern valleys, which were formerly accessible from the south only by mule track.

At present, the only highway in Sikkim is the narrow, twisting road that runs from Siliguri, an Indian railhead, nearly 70 miles into the Himalayas to Gangtok, the state's capital (Fig. 2). At the frontier town of Rango, a narrow suspension bridge, bedecked with Buddhist prayer flags, crosses the roaring Tista River into Sikkim. From Rango the road clings to the hillsides above the Tista in its rugged climb to over 5,500 feet and crosses several new bridges over narrow ravines. This partly-paved, partly-graveled highway is the life-line of Sikkim, which has neither railroads nor airfields. Along this road come much of the food and cloth that Sikkim needs, the equipment for helping her to develop, the Indian military power for protecting her frontier, and the occasional western tourists.

The road is also helping to build closer relations between the hitherto isolated communities of the Lepchas, Bhutias and

[11] *New York Times*, June 3, 1960.

[12] *Statesman* (Calcutta), January 3, March 17, 1960; *New York Times*, March 17, 1960.

[13] *Report on the Proceedings of the Pamir Boundary Commission*, Government of Calcutta, India, 1897.

Nepalese. The Lepchas, the original inhabitants of Sikkim, were overrun in the 16th and 17th centuries by the Bhutias, who came from Tibet. About 1890 Nepalese emigrants settled in the state. Today they form 60 per cent of Sikkim's population. An urgent need is to unify these three cultural groups, and new roads are welding them together. Sikkim's rich soft and hard woods and copper deposits are also becoming easily accessible with the improvement of transportation. The state's seven-year Plan for economic development, supported by India, stresses the construction of several new roads, agricultural and rural development, social services, power, irrigation and industry. Since 1954, India has spent $10 million on roads and more than $6 million on other programs.

As compared with neighboring Sikkim, Bhutan is more undeveloped. Here wheels are still alien and mule tracks are the only roads, but Bhutan is making a tremendous effort to modernize. Since the 1959 Tibetan revolt, traditional trade and cultural ties between Bhutan and Tibet have been severed, and a large influx of Tibetan refugees have put a great strain on the country.[14] Behind Bhutan's drive for modernity lies the knowledge of the brutal Chinese suppression of the Tibetan freedom and realization that, to preserve her liberty, she would have to cut her ties to the north and strengthen those with India.

The principal problem in bringing Bhutan closer to India is the lack of transportation. At present, goods are carried from the Indian frontier to the valleys of central Bhutan in baskets on the backs of barefoot porters or in bundles strapped to mules. All imports from India such as kerosene, gasoline and sugar, and crops heading for the Indian market move over the four-foot wide muddy mule track that climbs perilously over mountains and across plank bridges over roaring streams.

Bhutan's development program envisages construction of about 500 miles of road with $30 million Indian aid. Work has already started on the principal 120-mile road, usable by automobile, from Phunchholing on Western Bhutan's border with India to Paro, the temporary capital (Fig. 2). An offshoot from this highway will lead to Thimbu, the new permanent capital. About 15 miles of the Phunchholing-Paro road has been completed, and by May, 1961, it will be motorable up to Paro. The completion of this first of the five automobile highways to be built in Bhutan, will reduce the travel time between Paro and the Indian frontier from the present six days by mule and foot to ten hours by jeep. It will also enable Bhutanese farmers to transport cheaply to West Bengal the surplus rice that food-short Tibet once bought and India needs, but Bhutan, at present, has no economical way of shipping.

In addition to road building the development plans under the Indian economic aid (nearly $3.74 million annually) promises to end Bhutan's traditional isolation. Fearful of global power politics, India has discouraged direct relations between Bhutan and other foreign countries which may draw Bhutan into power politics and might seriously harm her progress towards social and economic stability. Although Bhutan is guided by India in external affairs, the internal administration is the sole responsibility of the King. The King is assisted in his administration by an advisory Assembly (Tsongdu) which was created six years ago. About 25 per cent of its 130 members are government officers appointed to the Assembly by the King, the rest are village headmen elected for five-year terms from all over the country. Several

[14] *Statesman* (Calcutta), June 14, 1960. See also W. Levi, "Bhutan and Sikkim: two buffer states," *The World Today*, Vol. 15, No. 12, 1959, pp. 492-500.

villages make up a Tsongdu constituency, and village headmen from each constituency choose, by agreement among themselves or by election, their representative to the Assembly. In turn, each village headman is chosen for a three-year term by election in which each family has one vote. For a country that is almost entirely illiterate and knows little about democracy, the elected Assembly and village headmen represent the basic foundation for giving people a voice in the government. Several changes have occurred in Bhutan's law, land tenure, and taxation, all of which were formerly haphazard.[15] But Bhutan still is a country without newspapers or political parties and has a long way to go in her struggle to enter the modern world.

[15] *Statesman* (Calcutta), April 15, 1960.

GEOGRAPHY AND THE SOCIAL SCIENCES—A NEW APPROACH

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A NUMBER of studies have been made which explain the relationship between geography and other fields of knowledge; these works have generally maintained that geography performs an integrating and synthesizing role among the various subject matter disciplines. While this approach may be of value in relating geography to the natural sciences, which are analytical fields possessing vast accumulations of factual knowledge; it does not always explain the relationships between geography and the social sciences. The social sciences, particularly the newer ones, have not accumulated as much subject matter material, and some of them profess to have a broad, synthesizing approach of their own.

In producing these synthesized studies of human society, the social scientists have been influenced by two basic methods of approach. One of these is the *macrocosmic* approach, which proceeds from a study of the external environment to the relationships between the men who who live in this environment. The other is the *microcosmic* approach, which proceeds from the needs and desires of the individual to his behavior in the world in which he lives. The first approach resembles that of the geographer, the second, that of the psychologist.

Each of these approaches has its own merits and its own limitations. When the social scientists were struggling to create new fields of learning, they borrowed freely from both approaches, and thus their early works proceeded on a balanced, comprehensive program. For example, in the field of anthropology (the most comprehensive of the social sciences) the early scholars attempted to explain human cultural development through the agencies of invention and diffusion. The study of invention led to a consideration of the psychological bases for the origin of culture; the explanation of diffusion led to a historical and geographical approach.

Thus, the adherents of invention assumed a "psychic unity of mankind,"[1] whereby men separated in time and space would independently devise similar items of culture. The early diffusionists explained the distribution of cultural elements by assuming that each trait had been invented in one locale and had subsequently spread to other places.

It is now recognized that both of these processes have played an important part in the development of human culture. What is significant for our purposes is that early anthropologists were cognizant

[1] Arolf Bastian, *Ethnische Elementargedanken in der Lehre vom Menschen*, Berlin, 1895.

of both approaches and that neither approach dominated the scene to the exclusion of the other. The diffusionistic approach reached its greatest development after 1911 in the *Kulturkreise* school of Fritz Graebner[2] and Father Schmidt, which assumed that entire complexes of culture had spread out, more or less intact, from their centers of origin.

Geography influenced anthropology in other ways, such as in the concept of the "culture area." Whereas the *Kulturkreise* school was the work of Euopeans, the culture area approach was devised by Clark Wissler around 1920 and was developed primarily by American anthropologists. The culture area, consisting of a group of similar cultures located in a distinctive physical habitat, was so similar to the regions of the geographer that a person trained in one field could feel at home exploring the material of the other.

The pioneer writers in sociology, another social science of comprehensive scope, likewise proceeded with a generalized and synthetic approach. For years sociology textbooks were patterned after *Principles of Sociology*, which was completed by Edward A. Ross in 1920.[3] This book covered a great variety of topics, including rural-urban differences, the distribution and composition of the population, and the influence of the geographic environment. What is equally important, the first sociologists were undertaking specialized research in areas which overlapped human geography. One of these was the "urban ecology" school of the Chicago sociologists, which evolved during the 1920's and which divided the American city into distinctive "natural areas." Another was the "regional" school of the North Carolina men, which appeared during the next decade and which divided the entire United States into six socio-economic regions. Another specialty of sociology was demography, or population analysis, which resembled geography when it attacked the problems of population distribution and migration.

The more specialized social scientists likewise showed an early interest in the geographic aspects of their fields. The classical economists, such as Adam Smith and Thomas Malthus, had developed principles of economic geography as well as economics. In the field of government, there was an interest in political geography, and historians realized that history without geography wanders as a vagrant.

There was a definite reason for this widespread interest in geography among social scientists. Geography had not yet become banished from the school curriculum, and it had much to offer the newer fields in the way of material and concepts. This situation changed radically, however, during the period of following the First World War.

One of the reasons for this change was the well-known discreditation of the school of geographic determinism. To geographers, this merely signalled a change in approach, but to many non-geographers it was interpreted as a discreditation of geography itself. The second reason for the change was the rise of psychology to a position of importance both in academic and non-academic circles.

Microcosmic Approach

The anti-geographic reaction first appeared in the works of Bronislaw Malinowski as early as 1922.[4] Attacking the diffusionists as "museum moles," Malinowski turned his attention to the workings of one particular cultural area, the Trobrianders of Melanesia. In his "functionalist" school, the relationship between items of a given culture, rather

[2] Fritz Graebner, *Die Methode der Ethnologie*, C. Winter, Heidelberg, 1911.

[3] Edward A. Ross, *Principles of Sociology*, Century, New York, 1920.

[4] Bronislaw Malinowski, *Argonauts of the Western Pacific*, Dutton, New York, 1922.

than the historic spread of culture, was the proper task of the anthropologist. Eventually his approach brought him into the field of the psychology of primitive man.

During the 1930's this trend continued with the development of the "configurational" school of Ruth Benedict, in which the anthropologist looked for general patterns of behavior which characterized each culture. It was but a step from this development to the "culture and personality" school of Cora Dubois, Ralph Linton and Abram Kardiner, which flourished during the 1940's. In this school, anthropologists worked closely with psychiatrists and drew heavily upon psychoanalysis and projective personality tests as tools of cultural research.

In sociology the change came much later. It began to manifest itself after 1935, the year in which George Gallup founded the American Institute of Public Opinion. Sociologists then began to show an increasing interest in public opinion polling. The measurement of attitudes, rather than the characteristics of the human group, became the focus of interest for many sociologists. The influence of public opinion polling and attitude measurement, to a lesser degree, spread to the other social sciences. During World War II, economists became interested in the behavior patterns of war bond purchasers. During the Korean War, George Katona, of the University of Michigan, undertook the study of the psychological factors which influenced the inflationary cycle of 1950-51. The political scientists were naturally interested in the political aspects of opinion polling, although it might be surmised that this interest declined following the events of 1948.

In appraising this widespread shift of interest, one must remember that psychology had gained immeasurably in prestige during the first half of the Twentieth Century. It had developed distinctive tools of research, and it had accumulated a considerable body of data through observation and experimentation. Further, it had developed the ability to place a great number of its graduates into positions in business and public service as well as in the academic world. In accomplishing these goals, it had earned the respect, and the envy, of the practitioners of the purely social sciences.

Thus, many social scientists became eager to imitate the psychologists. Psychological content and terminology found its way into social science textbooks, and psychology became one of the preferred fields of minor concentration for students in anthropology and sociology. To the extent that this trend encouraged social scientists to explore new vistas and to improve their own research techniques, it was beneficial. But, in all too many cases, this movement progressed to far.

Sociology textbooks began to resemble simplified treatises on psychology; some of these books either omitted demography and human ecology entirely or introduced these topics apologetically. Social scientists were spending a great deal of their time manipulating the research tools of the psychologist, such as Rorschach cards or opinion questionnaires. At this point a number of questions began to manifest themselves.

Influence on the Field of Geography

First, what would become of those areas of research, especially those bordering upon geography, which were being neglected? This has been answered by the expanding activities of geographers. If anthropologists slighted distributional studies, then cultural geographers could fill in the gap. If sociologists overlooked demography and ecology, then popula-

tion and urban geography could flourish all the more. Geographers, whose interests led them away from narrow specialization, were not adverse to exploring neglected areas of research.

Secondly, if the psychological trend continued in certain social sciences, would they be in danger of being absorbed into psychology? One prominent sociologist has declared that his field and that of psychology should be taught in the same department, but many of his colleagues are wary that they would simply lose their professional identity under these circumstances.

Thirdly, if social scientists received little training in areas related to geography, how would this affect their attitudes toward geography and their own professional competency? At the present time social scientists are often antagonistic toward geography, a situation which arises, in part, from an ignorance of its nature. It is surprising how common is the belief that geographers are necessarily determinists. This situation stems from the fact that social science textbooks may mention geography only when they present a critique of determinism; it is rarely explained that the geographers themselves joined in the overthrow of the Semple-Huntington school of thought.

In the matter of professional competency, one has only to look at the training of high school social science teachers, many of whom are teaching geography with little or no course work in this area. If their other social science courses fail to bring in occasional geographic ideas, the situation will become even more deplorable. Similar problems would arise if social scientists were to enter such fields as regional or community planning with no foundation in geography.

The fourth question is more subjective in nature, but it cannot be ignored. Is the increased emphasis upon the workings of the human personality bringing a new type of student into social science, the man who is more concerned with his own problems than those of society? Geographers are indeed fortunate that their training and emphasis has so effectively screened out this type of person from their ranks.

In Conclusion

Although certain social scientists have gone so far as to label their fields "the behavioral sciences," it must be conceded that this trend has not entirely dominated their fields. The worst offenders have been the men who have siezed upon the new ideas and techniques as if they were fads. We have not mentioned the minority of sociologists who continued to work with human ecology and population studies, even when they faced the criticism that their efforts were not sociology. We have not mentioned those anthropologists who continued to study distributions. This latter category would include the members of the archeological school, whose investigations required them to have a knowledge of such earth sciences as physiography, climatology and surveying. Further, the drift toward a psychological emphasis was less evident in the fields of economics and political science, and the historians were hardly affected at all.

In fact, a note of optimism may be found in evidences of a renewed interest in geography among social scientists. Social science educators are permitting geography to reappear in the high school curriculum as an independent subject, and not as an "element" in a series of combined courses. This development will satisfy the historians, who are complaining that their students do not know enough geography to understand history. Some recent books by anthropologists have shown a renewed interest in culture

areas, and one member of the culture and personality school had returned to the study of cultural diffusion in his last published work.[5] Likewise, certain recent sociology texts have shown a renewed concern with the spatial aspects of society, and Southern sociologists have reported a revival of interest in their old regional school of thought.

It is hoped that these developments are signs that the social scientists are returning to their rightful task, that of evaluating both the macrocosmic and the microcosmic elements which affect human society. As Americans realize their geographic illiteracy, the fear of being labeled a geographic determinist, as all such fears of name-calling, must lose its effect. It is heartening to note that the anthropologist Robert Lowie anticipated these developments as long ago as 1937 when he wrote:

> The aversion from geography is historically comprehensible, but none the less unjustifiable. No ethnologist now shares the delusion that culture is man's inflexible reaction to his surroundings, a view repudiated by Ratzel himself. . . . But when every possible allowance is made, the obvious fact still stands that societies have attained solutions of practical problems. Further, this adaptation to the conditions of life constitutes the outstanding intellectual achievement of mankind. Everything, then, that contributes to our insight into the conditions offered by nature deepens our insight into the character of culture. "Human geography," says Forde, "demands as much knowledge of humanity as of geography." He is right, but he is addressing geographers; for the student of culture the maxim should be reversed.[6]

[5] Ralph Linton in *The Tree of Culture*, Knopf, New York, 1957.

[6] Robert H. Lowie, *The History of Ethnological Theory*, Rinehart, New York, 1937, pp. 261-2. Quoted by permission of Holt, Rinehart and Winston, Inc.

PROBLEMS OF TRANSPORTATION ROUTES IN IRAN*

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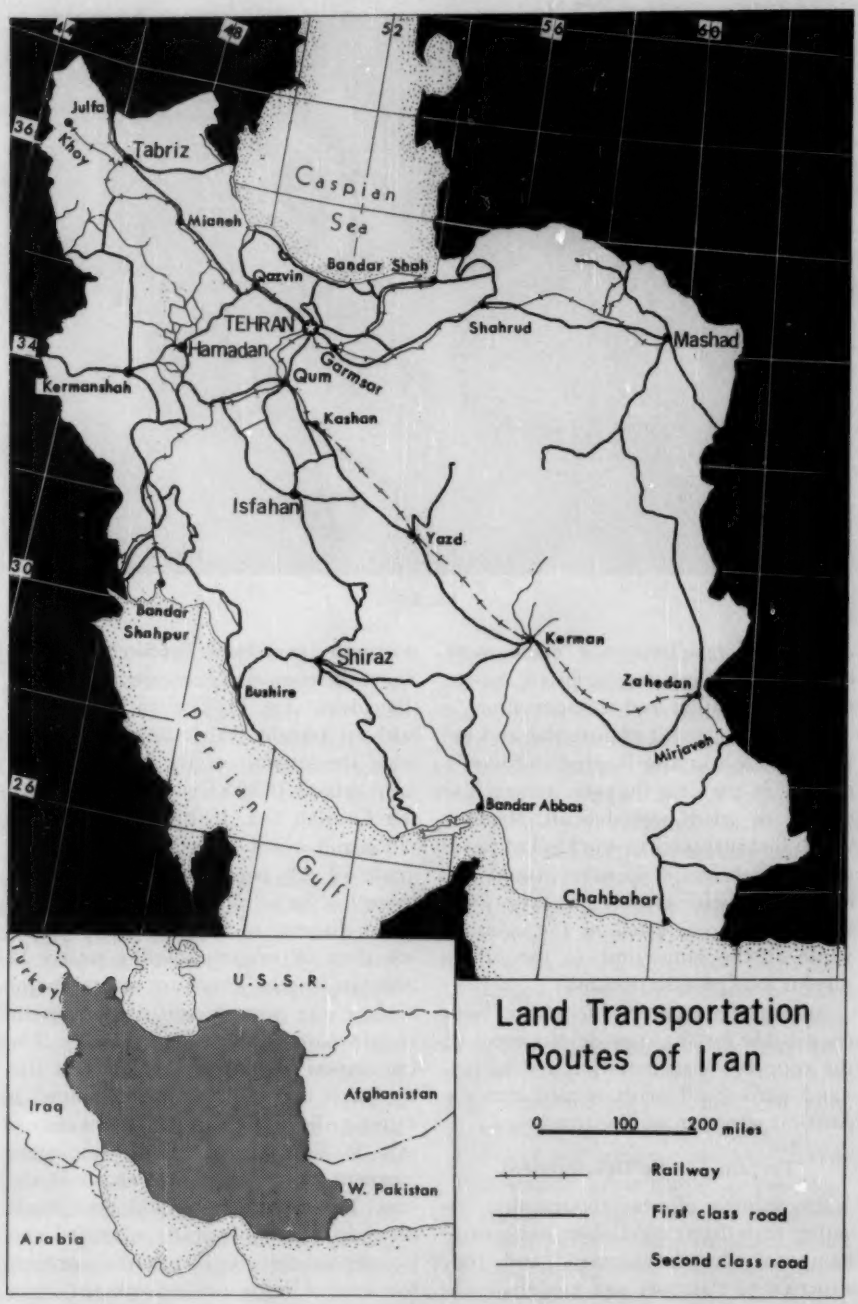
FOR SEVERAL millenniums camel caravans were the only means of land transport in Iran. Many well established caravan routes that linked the Orient with the Middle East and Europe can still be traced by the remains of the caravanserais, or overnight stopping places, which were built at 20 mile intervals along these routes.

About 25 centuries ago, Iran had a good system of highway and trunk roads which was quite advanced for the period. Darius I, the famous king of the Persian Empire (553-331 B.C.) realized the importance of good roads and rapid communications for maintaining a powerful central government. Hence, he created a system of military highways and posting stations which linked the strategic centers of the provinces, known as *satrapies*, to the political capital of Empire, situated first at Susa and later at Babylon. Then for 1,500 years few improvements were made in the transportation system.

The development of modern transportation facilities was delayed until the 19th century. The resultant political and economic disadvantages of this delay threatened the integrity of the state during recent decades.

During the last century, many seminomadic tribes in their desire for autonomy took advantage of the inadequate transportation system and waged successful rebellions against the central government. The problem of putting

* This article is based upon a Master's thesis written under the supervision of Dr. John Randall, Professor of Geography, The Ohio State University. The map was prepared under the supervision of Mr. Robert C. Kingsbury, Indiana University.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Kashan
Isfahan
Yazd
Bandar
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Shiraz
Kerman
Zahedan
Bushire
Persian
Gulf
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Railway
First class road
Second class road

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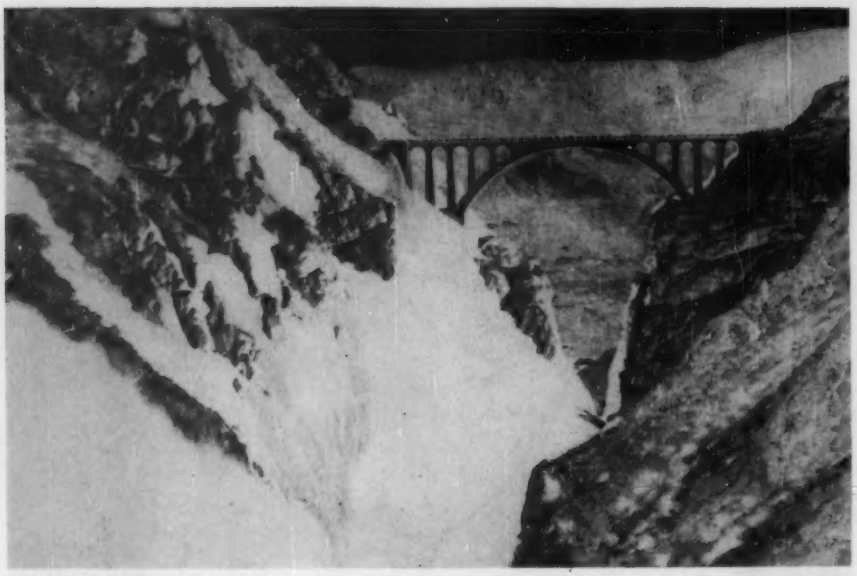

FIG. 2.

down such rebellions was made more difficult by the existing inefficient system of communication and transportation.

The development of internal and external trade was also limited and handicapped, in part, for the same reason. Exchange of goods was difficult. Regions which had surpluses in one kind of product and deficiencies in others could not exchange their goods. Famines were common in some parts of the country, while at the same time in the others surplus food products existed.

Among the factors which have been responsible for the slow development of the country's transportation system two stand out: the difficult terrain and the political situation of the country.

Terrain Limits Development

Ruggedness of the topography, together with desert conditions, has greatly hampered the development and construction of railroads and modern highways. For example, while constructing a section of the trans-Iranian railway (in northern Iran) from Tehran to Bandar Shah, the engineers encountered unusual difficulties (Fig. 1). The track had to be laid on terrain which descends steeply from the summit of the Elburz Mountains (about 18,000 feet) to the shores of the Caspian Sea. In order to gain distance and avoid exceeding a maximum grade of 2.8 per cent, three complete loops had to be made at one point. In a direct distance of 21 miles, there are no less than 69 tunnels totaling nearly 12 miles in length. There are several major bridges, the most spectacular being the simple-span Vresk Bridge (Fig. 2). The uniqueness of one of the loops in this section is that the line in one tunnel is directly above itself in the return tunnel (Fig. 3). This type of difficulty was quite frequent along the entire length of the line. These problems would be difficult for even a technologically advanced and prosperous state; for Iran, with its general low level of living, underdeveloped status and shaky economy, they were certainly even more extreme.

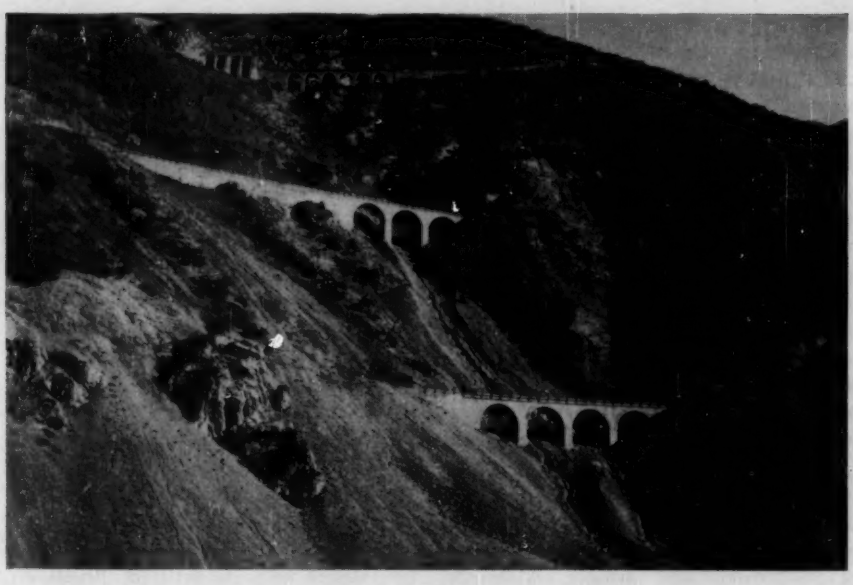

FIG. 3.

Political Situation

From a political standpoint, the fact that Iran shares a long border with Russia and is near India, which was a British Colony, have been two major factors which have influenced the country's development.

Economic and political incentives in 1916 made the Russians build a 5-foot gauge, 120 mile line from Julfa to Tabriz (Fig. 1). For similar reasons the British extended the trans-Baluchistan line westward from Mirjaveh to Zahidan in southeast Iran, during World War I. The latter line was 50 miles in length and was built with the extremely broad gauge of five and one half feet. The proximity of these two powers influenced the Iranian government, for a long time, not to build a north-south or east-west railway. The Iranian officials were afraid the construction of a railway might increase foreign interference in the country before being a real economic benefit to it.

When Reza Shah assumed control of Iran in 1925, he launched an ambitious program for the development of transportation. One of the major objectives of this program was the construction of the Trans-Iranian Railroad, from the port of Bandar Shahpur, at the head of the Persian Gulf, to Tehran and then northward to the port of Bandar Shah on the Caspian Sea—a total distance of 870 miles. Although the costs of constructing a rail line through extremely rugged terrain would impose a tremendous strain upon the finances of the state, Reza Shah was determined to build it without the help of foreign finance. In 1939, the main route of the Iranian State Railway was completed as a single-track, standard gauge line, linking the northern and southern extremity of the country.

Political and strategic motives played a considerably greater role in the decision to construct the Trans-Iranian Railroad than did economic considerations. For one thing, this rail line passes through the Zagros Ranges, the home area of the semi-nomadic tribes who on innumerable occasions had thwarted the

authority of the central government. In addition to the pacification of dissident tribal groups, one of the strongest motivations for the construction of this expensive rail line was the desire to weaken the strong trade ties between the most productive and populous region of Iran, the Caspian provinces, and Russia. Previously, the Caspian provinces imported petroleum from Baku and, aided by reduced Russian tariffs, exported nonmanufactured goods to Russia. The factors mainly responsible for a subsequent decrease in Russian-Iranian trade, however, were the strengthening of German-Iranian relations prior to World War II and post-war political events. The recent conversion of the Julfa-Tabriz line from the 5-foot Russian-gauge to standard gauge is consistent with the earlier goals of the Trans-Iranian rail project. Although, among other things, the Trans-Iranian rail line made possible the efficient interchange of petroleum and other commodities between the northern and southern portions of Iran, the completion of this line only marked a start toward an effective economic integration of the country.

Prior to the completion of the Trans-Iranian Railroad, in 1938, the government had decided to link the country from east to west by constructing a railroad from Tehran to Tabriz (461 miles) and from Garmsar to Mashad (504 miles). Unfortunately, completion of this line, which was much more significant to the economy of the country, was delayed by the Second World War. The Tabriz line was completed to Mianeh, 273 miles, in 1943, and the section between Garmsar and Shahrud (195 miles) on the Mashad line was completed in 1941. The completion of the Sharud-Mashad section was postponed until 1956, and that of the Mianeh-Tabriz section until 1958.

According to present plans, the Qum-Yazd line will extend from Qum to a little beyond Zehedan on the Afghanistan border. Here, it will connect with the Pakistan broad-gauge railway. This road is completed as far as Kashan and the remaining section is now under construction.

One of Reza Shah's main ambitions was to give Iran a modern transportation system. Although he did not achieve this in full, at least to his credit belongs the framework of the present highway system. During his reign most of the present-day roads took form little by little.

The major highways, in general, had a pattern quite similar to that of the ancient trails and caravan routes. The routes took cognizance of the major land forms, climatic difficulties, and also the relative importance of economic development in the various regions of the country. A glance at the map (Fig. 1) readily shows that the great area of interior desert remains isolated. Roads encircle it but none cross it. So difficult is the climate and weather in eastern Iran that the main eastern highway from north to south seeks a rather circuitous route through the cooler and wetter eastern highland rather than follow the easier terrain at its base on either side where temperatures are extreme and water scarce.

Present Situation and Prospects

In 1960, Iran had 2,060 miles of railroad including the Julfa-Tabriz Railroad, whose gauge was changed to a standard gauge in 1958, thereby providing a unified system. Since the war, 70 new diesel electric locomotives have been imported from the United States and more are on order.

Also, there are 20,000 miles of roads suitable for vehicular traffic. Of this, 9,000 miles are all-weather roads of which only 1,200 miles are paved with asphalt. The rest are secondary gravel roads.

Today, North Khurasan, the Tehran-Kazvin area, and Azerbaijan all have direct rail connections with one another.

Tabriz and Mashad, two of Iran's largest cities, are terminals of the east-west line. When completed, the Qum-Zahedan line will link India and Pakistan with Turkey and the USSR via Iran, and this line will add to the strategic position of Iran.

Of the five countries bordering Iran, none, today, has common-gauge rail connections with the Iranian system. Matching the gauge of the Tabriz-Julfa line with the other Iranian rail lines has decreased the possible economic and political threat of the Soviet Union.

After the completion of the rail line to Zahedan near the Pakistan border, the Iranian government has no plans for additional rail construction. Modern trunk highways and an adequate number of hard-surfaced secondary roads can serve the country better economically, and probably politically, than could a few, more expensive and difficult-to-build rail lines.

The state has a better start on an adequate road system than on a rail system with a program that will, when completed, give it a network of all-weather highways that will not only enhance the economy but also serve to strengthen political unity. This road program, developed by the Overseas Consultants Incorporation (Seven Year Plan), calls for the construction, by 1966, of 24,000 miles of roads, including 8,000 miles of secondary ones.

When the projected roads are completed the more populous and productive areas of the country will have a much improved system of hard-surfaced, all-weather routes, and no city of any size will be without modern road connection. Tehran will be the hub of the transportation system, and within comparatively easy reach of all sections of the state. It should be emphasized that certain of the projected routes are of strategic importance as well as economic. For the first time, areas of Zagros, inhabited by the semi-nomadic tribes, will be penetrated by a large number of highways, allowing relatively easy access. Also Chahbahar, in the south-east, and Bandar Abbas, on the strait of Hormuz, will have adequate routes connecting them to the remainder of the state. Both of these routes can be of military importance in time of crisis.

Given an opportunity to complete its projected program of road development, Iran will, for the first time in many years, have a transportation system that is adequate for its needs and one that is technologically up-to-date.

RADIO SOURCES OF WEATHER INFORMATION

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Introduction

OBTAINING current weather information for research or instructional use at small, isolated, or temporary installations tends to be both difficult and costly unless the budget permits a teletype installation and provides funds for an operator. United States Weather Bureau maps, received by mail, are excellent records of what has happened, but they are of little value in determining what is likely to happen tomorrow.

In a few fortunate locations, meteorologists have been able to receive dependable weather information from standard broadcast and television stations. A few stations in these categories make a very successful effort to present weather information promptly and accurately.

At a great majority of broadcast and television stations, however, the weather information, even though it originates at the United States Weather Bureau, has been reworked and paraphrased, ap-

parently by an understudy of the Delphic Oracle, until it is of little value to the serious user. Data presentation at some of these stations is so erratic that the weather parameters for Fallen Arches, Nebraska, may be confused with the "vital statistics" of the current weather girl. Additionally, weather information broadcasts are commonly interrupted by long perorations extolling the supposed merits of such items as Bilgewater Beer and Joe Blow Yogurt.

Fortunately, dependable weather information, carefully and frequently presented, is available from a number of radio stations established by the United States Government to serve the needs of air and marine navigation. Most of the aeronautical weather information is broadcast in voice; a considerable part of the marine weather information is transmitted in Morse code.

Comparable weather information broadcasts are available in Canada, where a network of beautifully-equipped stations is skillfully operated. Mexico has a small network of aeronautical and marine radio stations, currently being improved and expanded as equipment and trained personnel become available. Mexican weather broadcasts are in Spanish; they use metric units.

Aeronautical Weather Broadcasts

Radio range stations with voice facilities broadcast weather information at 15 and 45 minutes after the hour along with station identification, local time, and Greenwich time. Frequencies of these stations are between 200 and 400 kilocycles per second. Weather information transmitted is substantially that contained in the local teletype sequences. Between the regularly scheduled broadcasts, "flash advisories" are transmitted when needed. These radio range stations are of relatively low power (about 150 watts) so that their range is limited, but they are so numerous that two or three can be received in most areas.

Similar weather information broadcasts are made by many omni-directional radio ranges operating between 108 and 118 megacycles. Effective transmitting ranges of stations in this frequency range are about 4/3 of sight distance regardless of power output.

Recently, in the low frequency range (200-400 kc.), construction was started on a system of continuously-broadcasting weather information stations. Eventually there will be 88 stations in the system giving national coverage. Pioneer stations in this system, at Washington, D.C., and Indianapolis, Indiana, have already been in operation for approximately two years.

Locations and frequencies of the various aeronautical radio stations are published periodically in the Airman's Guide, available from the Government Printing Office, Washington 25, D.C., at about 40 cents per copy (price varies with content of issue).

Similar information is available from the Sectional Aeronautical Charts, published by the United States Coast and Geodetic Survey, Washington 25, D.C., at about 25 cents per sheet. An index is available upon request, and the maps pertinent to your area can be ordered from this source. These are excellent topographic maps which are frequently revised and corrected. Radio range information is placed on these maps by means of colored overprints. Pertinent information for interpreting the radio range station overprints (colored maroon) is given in Fig. 1. Keys to all other symbols and overprints are printed on the reverse side of the map. Any changes which have occurred since the map was printed are listed in the Airman's Guide, which is available at many technical libraries and is serially filed at local offices of the Federal Aviation Agency.

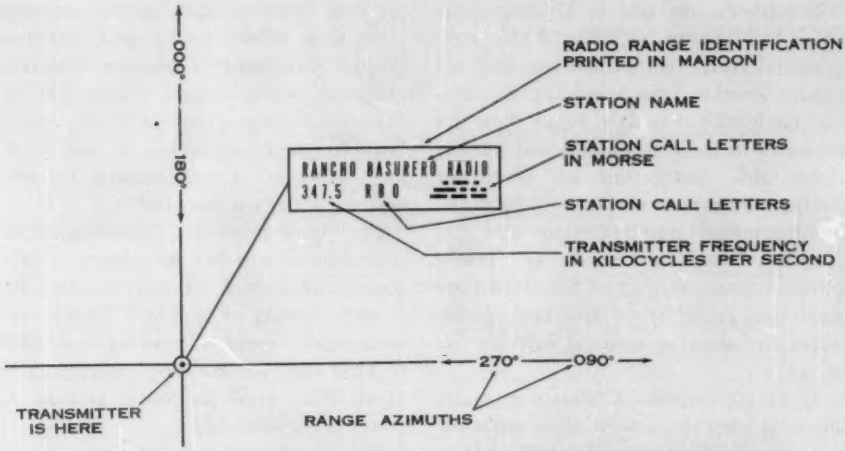

FIG. 1. Key to radio range station data printed on sectional aeronautical maps.

Marine Weather Broadcasts

To provide weather and other information to coastwise and international ship and air traffic, a vast network of marine radio stations, transmitting on frequencies from 14 kilocycles to somewhere above 250 megacycles, has been established. Although these, in general, are operated by the governments upon whose territory they are based, weather information is commonly pooled so that important functions, such as hurricane tracking, are truly cooperative enterprises. Many of the marine radio stations, in addition to the weather broadcast functions, are in radio communication with ships at sea and receive from them not only current weather information but also reports of "hazards to navigation" and other information of interest to mariners.

Locations of marine radio stations, their transmitting frequencies, and their broadcast schedules are indexed in a number of official publications. Simplest of these is the Coastal Warning Facilities Chart Series, prepared annually by the United States Weather Bureau and available from the Superintendent of Documents, Government Printing Office, Washington 25, D.C., at five cents each. The series includes twelve charts and covers not only all shores of the United States but also the Great Lakes.

Similar information is contained in the International Flight Information Manual, published annually by the Federal Aviation Agency and available at 60 cents from the Government Printing Office.

Detailed information concerning radio weather broadcasts in all parts of the world, systematically corrected and brought up to date by insertable correction sheets, is contained in United States Navy Hydrographic Office Publication No. 206, "Radio Weather Aids." This lists all weather transmissions on all frequencies, at all fixed stations, and includes transmission times, transmission types, and languages used in the broadcasts. From this, for example, we learn that Reykjavic Radio (call letters TFA) transmits weather information in voice on 276 and 1650 kilocyles, and that the 0530, 1130, 1730, and 2330 (Universal time, GMT) broadcasts are given in Icelandic and repeated in English. A map showing the Icelandic weather forecast areas is included.

Companion to this is Hydrographic Office Publication No. 205, "Radio Navigational Aids," which lists not only ordinary weather broadcasts but also special navigational signals. Maps show the locations of the transmitters and navigational aids. Instructions are given for contacting navigational stations by radio. Summaries of standard time and frequency broadcasts such as WWV (United States Bureau of Standards) are included along with standard procedures for securing medical information at sea.

H. O. 205 contains a tabular appendix showing what stations transmit what signals at specific times all GMT. A portion of this table comprises Fig. 2. (Hydrographic Office publications are available from the Naval Aviation Supply Office, 5801 Tabor Road, Philadelphia, 20, Pennsylvania. H. O. 205 costs $5.00, and H. O. 206 costs $4.50.)

Similar information, in part duplicating the above and in some instances obsolete, is contained in a wide variety of navigational training manuals and textbooks; many of which, because of obsolescence, are available second-hand or "surplus" very cheaply. In contrast, because of the continual revision procedure, the official government publications, when checked against the "Notices to Airmen" and "Notices to Mariners," are usually within 30 days of being current.

Receivers

A majority of the "professional type" weather broadcasts are on frequencies not receivable on standard broadcast receivers, and some special receiving equipment is needed to take advantage of them. Those transmissions which are at frequencies between 1500 kilocycles and about 30 megacycles are receivable on a communications receiver. These instruments are made in wide variety and an even wider price range. Workable communications receivers currently range in price from kits at about $29.95 to complicated "professional" receivers costing more than $2500. Any communications receiver purchased for weather reception purposes should contain a noise limiter. If only voice signals are to be received, a beat frequency oscillator is not necessary; however, if code signals are also desired, a BFO is essential.

For "show how" and "occasional use" reception of weather broadcasts, a relatively inexpensive receiver is adequate. A wide variety of standard brand communications receivers, costing from $100 to $150 new ("good used" receivers cost about 60 percent as much as new receivers), are available.

For "must get" weather signal reception in the frequency range 550 kc. to 30 mc., a better receiver is desirable, and several in the price range $500 to $1500 perform excellently. These higher-priced receivers will only give superior performance if skillfully operated and adequately maintained.

For reception of marine and radio range broadcasts in the 200-400 kilocycle frequency range, several commercially-built receivers are available at moderate prices including several kits and several "all transistor" models. A few communications receivers, such as the National NC-66, have an integral long-wave band.

Many professional users of radio range station weather signals employ "surplus" command receivers, such as the BC-453, the ARB, and the R23/ARC-5. These are usually converted to operate on 110 volts, 60 cycles. The better conversions have an improved audio frequency system and a noise limiter added. A panel view of a converted R23/ARC-5 receiver comprises Fig. 3. Conversion methods have been outlined several times in various issues of the standard radio magazines (*QST, CQ, Radio-Electronics, Radio and Television News,* etc.) and in several special manuals (*Surplus Radio Conversion Manuals,* 3 vols., $2.50 each, Editors and Engineers, Summerland, Calif.). These receivers, either "as is" or skillfully con-

APPENDIX B

H.O. PUB. NO. 205
RADIO NAVIGATIONAL AIDS

BROADCAST SCHEDULES OF U.S. NAVAL AND COAST GUARD STATIONS TRANSMITTING MERCAST, HYDROGRAPHIC DATA, WEATHER, ICE REPORTS, AND TIME SIGNALS

JANUARY, 1958

THIS SCHEDULE SHOULD BE POSTED IN THE RADIO ROOM

ATLANTIC STATIONS

Time GMT	Station	Call Sign	Frequency in kilocycles. Type of emission A1 except as noted.	Material broadcast: Mercast	Weather	Hydro	Time
-----	Galveston, Tex.[7]	NOY	428	-----	W10	H[5]	-----
0020	San Juan, P.R.[7]	NMR	126.85, 4795	-----	W9, 10	H[5]	-----
	New Orleans, La.[7]	NMG	428	-----	W9, 10	H[5]	-----
0035 to 0110	Washington, D.C.	NSS	121.95, 5870, 9425, 12804, 17050.4, 22581	-----	W	-----	-----
0040	Argentia, Nfld.	NIK	155, 5330, 8502	-----	-----	H[5]	-----
0050	Boston, Mass.[7]	NMF	466	-----	W9, 10	H[5,6]	-----
0100	New York, N.Y.[7]	NMY	486	-----	W10	H[5,6]	-----
	Miami, Fla.[7]	NMA	440	-----	W10	H[5]	-----
0120	Norfolk, Va.[7]	NMN	486	-----	W10	H[5,6]	-----
0125	Jacksonville Beach, Fla.[7]	NMV	440	-----	W10	H[5]	-----
0155 to 0200	Washington, D.C.	NSS	121.95, 5870, 9425, 12804, 17050.4, 22581	-----	-----	-----	T
0200	Balboa, C.Z.[7]	NBA	147.85, 5448.5, 11080, 17127.2	M	-----	-----	-----
0200 to 0300	Asmara, Eritrea	NKA	4515, 8678, 12817.5, 22760	-----	W	-----	-----
0230	Port Lyautey, F.M.	NHY	4623, 7535, 12145	M[7]	-----	-----	-----
0250 to 0330	Washington, D.C.	NSS	121.95, 5870 9425, 12804, 17050.4, 22581	M	-----	-----	-----
0300	San Juan, P.R.[7]	NMR	2678 (A3)	-----	W9, 11	H[5]	-----
	Asmara, Eritrea	NKA	3220, 4515, 8678, 12817.5, 22760	M	-----	-----	-----
0420	Boston, Mass.[7]	NMF	2694 (A3)	-----	W11	H[5]	-----
	Charleston, S.C.[7]	NMB	2678 (A3)	-----	W11	H[5]	-----
	St. Petersburg, Fla.[7]	NOF	2678 (A3)	-----	W11	H[5]	-----
0430	Balboa, C.Z.[7]	NBA	147.85, 5448.5, 11080, 17127.2	-----	-----	H	-----
0430 to 0530	Washington, D.C.	NSS	121.95, 5870, 9425, 12804 17050.4, 22581	-----	-----	H[5]	-----
0450	New York, N.Y.[7]	NMY	2662 (A3)	-----	W11	H[5]	-----
	Miami, Fla.[7]	NMA	2678 (A3)	-----	W11	H[5]	-----
0455 to 0500	Balboa, C.Z.[7]	NBA	147.85, 5448.5 11080, 17127.2	-----	-----	-----	T[5]
0500	Port Lyautey, F.M.	NHY	4623, 7535, 12145	-----	-----	H	-----
	Asmara, Eritrea	NKA	4515, 8678, 12817.5, 22760	-----	-----	H	-----
0520	Norfolk, Va.[7]	NMN	2702 (A3)	-----	W11	H[5]	-----
	Galveston, Tex.[7]	NOY	2686 (A3)	-----	W9, 11	H[5]	-----
0530	Balboa, C.Z.[7]	NBA	147.85, 5448.5, 11080, 17127.2	-----	W	-----	-----
	Port Lyautey, F.M.	NHY	4623, 7535, 12145	-----	W	-----	-----
0530 to 0550	Washington, D.C.	NSS	121.95, 5870, 9425, 12804, 17050.4, 22581	-----	W	-----	-----
0550	Cape May, N.J.[7]	NMK	2662 (A3)	-----	W9, 11	H[5]	-----
	New Orleans, La.[7]	NMG	2686 (A3)	-----	W9, 11	H[5]	-----
0555 to 0600	Washington, D.C.	NSS	121.95, 5870, 9425, 12804, 17050.4, 22581	-----	-----	-----	T
0600 to 0630	Washington, D.C.	NSS	121.93, 5870, 9425, 12804 17050.4, 22581	-----	W	-----	-----
0620	Jacksonville Beach, Fla.[7]	NMV	2678 (A3)	-----	W9, 11	H[5]	-----
0630	Port Lyautey, F.M.	NHY	4623, 7535, 12145	M	-----	-----	-----
0630 to 0730	Washington, D.C.	NSS	121.95, 5870, 9425, 12804, 17050.4, 22581	M[7]	-----	-----	-----
0700	Asmara, Eritrea	NKA	8678, 12817.5, 22760	M[7]	-----	-----	-----
0755 to 0800	Washington, D.C.	NSS	121.95, 5870, 9425, 12804, 17050.4, 22581	-----	-----	-----	T
0800	Balboa, C.Z.[7]	NBA	147.85, 5448.5 11080, 17127.2	M[7]	-----	-----	-----
1235 to 1310	Washington, D.C.	NSS	121.95, 5870, 9425, 12804, 17050.4, 22581	-----	W	-----	-----
1245	Argentia, Nfld.	NIK	155, 5330, 8502	-----	-----	H[5]	-----
1355 to 1400	Washington, D.C.	NSS	121.95, 5870, 9425, 12804, 17050.4, 22581	-----	-----	-----	T
1400	Balboa, C.Z.	NBA	147.85, 5448.5 11080, 17127.2	M	-----	-----	-----
	Asmara, Eritrea	NKA	8678, 12817.5, 22760	-----	W	-----	-----
1430	Port Lyautey, F.M.	NHY	7535, 12145, 17395	M	-----	-----	-----
1430 to 1530	Washington, D.C.	NSS	121.95, 162* 5870, 9425, 12804, 17050.4, 22581	M[7]	-----	-----	-----
	Asmara, Eritrea	NKA	8678, 12817.5, 22760	M[7]	-----	-----	-----
1500	San Juan, P.R.[7]	NMR	2678 (A3)	-----	W9, 11	H[5]	-----
	New York, N.Y.[7]	NMY	486	-----	W10	H[5,6]	-----
1600	Miami, Fla.[7]	NMA	440	-----	W10	H[5]	-----
	Balboa, C.Z.[7]	NBA	147.85, 5448.5, 11080, 17127.2	-----	-----	H[5]	-----
	Boston, Mass.[7]	NMF	2694 (A3)	-----	W11	H[5]	-----
	Norfolk, Va.[7]	NMN	466	-----	W10	H[5]	-----
1620	Charleston, S.C.[7]	NMB	2678 (A3)	-----	W11	H[5]	-----
	St. Petersburg, Fla.[7]	NOF	2678 (A3)	-----	W11	H[5]	-----
	San Juan, P.R.[7]	NMR	126.85, 4795	-----	W9, 10	H[5]	-----
1625	Jacksonville Beach, Fla.[7]	NMV	440	-----	W10	H[5]	-----
1630	Baltimore, Md.[7]	NMX	2702 (A3)	-----	W9, 11	H[5]	-----
1630 to 1730	Washington, D.C.	NSS	121.95, 162*, 5870, 9425, 12804, 17050.4 22581	-----	-----	H[5]	-----
	Boston, Mass.[7]	NMF	466	-----	W9, 10	H[5,6]	-----
1650	New York, N.Y.[7]	NMY	2662 (A3)	-----	W11	H[5]	-----
	Miami, Fla.[7]	NMA	2678 (A3)	-----	W11	H[5]	-----
1655 to 1700	Balboa, C.Z.[7]	NBA	147.85, 5448.5, 11080, 17127.2	-----	-----	-----	T[5]
	Balboa, C.Z.[7]	NBA	147.85, 5448.5, 11080, 17127.2	-----	W	-----	-----
1700	Fort Mason, N.C.[7]		2702 (A3)	-----	W9, 11	H[5]	-----
	Port Lyautey, F.M.	NHY	7535, 12145, 17395	-----	-----	H	-----
	Asmara, Eritrea	NKA	8678, 12817.5 22760	-----	-----	H	-----
	Norfolk, Va.[7]	NMN	2702 (A3)	-----	W11	H[5]	-----
1720	New Orleans, La.[7]	NMG	428	-----	W9, 10	H[5]	-----
	Galveston, Tex.[7]	NOY	2686 (A3)	-----	W9, 11	H[5]	-----
1730	Port Lyautey, F.M.	NHY	7535, 12145, 17395	-----	W	-----	-----
1730 to 1750	Washington, D.C.	NSS	121.95, 162*, 5870, 9425, 12804, 17050.4 22581	-----	W	-----	-----
1750	Cape May, N.J.[7]	NMK	2662 (A3)	-----	W9, 11	H[5]	-----
	New Orleans, La.[7]	NMG	2686 (A3)	-----	W9, 11	H[5]	-----
1755 to 1800	Washington, D.C.	NSS	121.95, 162*, 5870,9425, 12804, 17050.4 22581	-----	-----	-----	T
1800 to 1830	Washington, D.C.	NSS	121.93, 162*, 5870, 9425, 12804, 17050.4, 22581	-----	W	-----	-----
1820	Jacksonville Beach, Fla.[7]	NMV	2678 (A3)	-----	W9, 11	H[5]	-----
1830	Port Lyautey, F.M.	NHY	7535, 12145, 17395	M[7]	-----	-----	-----
1830 to 1930	Washington, D.C.	NSS	121.95, 162*, 5870, 9425, 12804, 17050.4, 22581	M	-----	-----	-----
1900	Asmara, Eritrea	NKA	3220, 4515, 8678, 12817.5, 22760	M	-----	-----	-----
1955 to 2000	Washington, D.C.	NSS	121.93, 162*, 5870, 9425, 12804, 17050.4, 22581	-----	-----	-----	T
	Balboa, C.Z.[7]	NBA	147.85, 5448.5	M[7]	-----	-----	-----

FIG. 2. Portion of U. S. Naval and Coast Guard weather broadcast timetable.

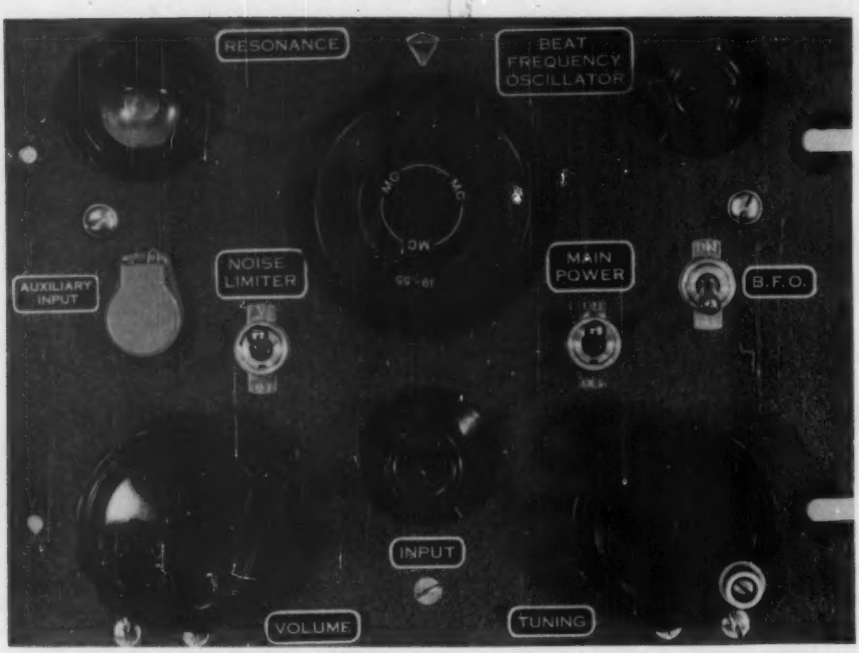

Fig. 3. Panel view of R23/ARC-5 command receiver converted for weather broadcast reception.

verted, are quite easy to operate, perform consistently, and require a minimum of maintenance.

Where it is desirable to receive the entire marine band (14 to 550 kilocycles), a more complicated long-wave receiver is needed. These receivers are not mass-produced at present and are prohibitively costly if custom-built. However, one of the Navy receivers, the RAK-7, is soundly designed and is an excellent performer. This receiver, now available on the surplus market at a fraction of its original cost to the Government, is fairly easily convertible for operation from the regular A. C. power lines with modern tubes. A panel view of a modernized RAK-7 comprises Fig. 4. Modernization of this receiver is not a "one evening job," and the finished conversion is not readily portable. However, the performance is excellent and it is possible to receive European and Australian weather broadcasts in the Pacific Coast area of the United States with clarity and some consistency.

Receivers for the VOR frequency band (108-118 megacycles) are usually those made for aircraft and airport use and are advertized in the aviation magazines rather than in the radio magazines and catalogs. These receivers, which must meet FAA specifications, are extremely stable, rugged, and costly. Used aircraft receivers in good operating condition are sometimes available at bargain prices, but they usually need a special power supply, for most aircraft equipment is designed for 12 or 24 volts D. C., or 115 volts, 400 cycles, A. C., while household electrical supply, in most parts of North America, is 110 volts, 60 cycles.

The high frequencies, including the VOR band, can be received satisfactorily on a Hallicrafter S-27 receiver, now discontinued but occasionally available second hand. They may also be received on the military R44/ARR-5 receiver now available on the war surplus market at about a dollar a pound. Both receivers

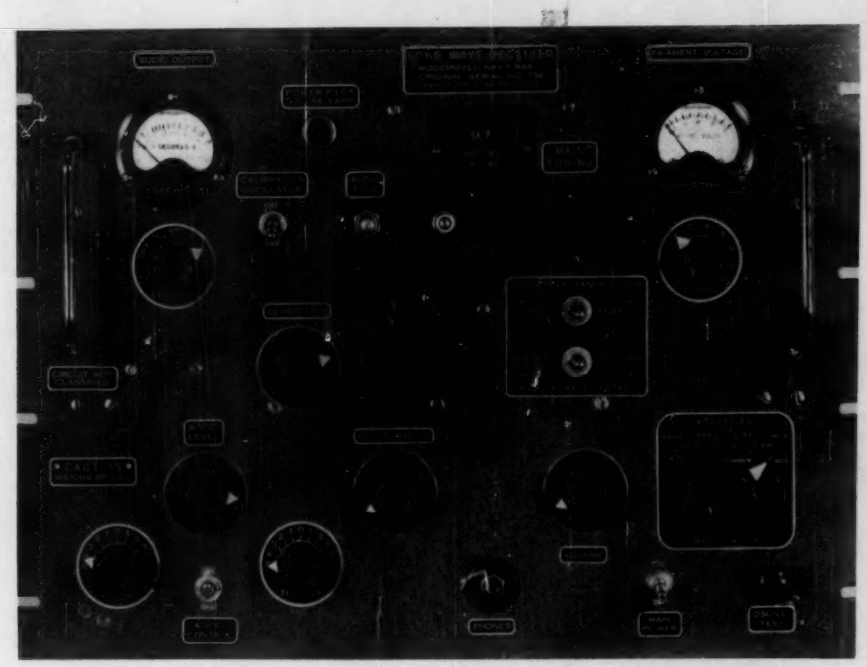

FIG. 4. Panel view of modernized Navy RAK-7 receiver, having a frequency range of 14-550 kilocycles.

are more than adequate for weather broadcast reception, are reasonably easy to operate, and require a minimum of maintenance work.

Where a good communications receiver is available, signals at frequencies outside of its wavebands can usually be received by use of a converter. This is a device which changes the frequency of an incoming signal to some other frequency within the range of the receiver in use. Commercially made converters are advertized in the standard radio magazines, and methods of making them are outlined in several radio handbooks (*Radio Amateur's Handbook,* 37th edition, 1960, American Radio Relay League, West Hartford 7, Conn., $3.50; *Radio Handbook,* 15th edition, 1959, Editors and Engineers, Summerland, Calif., $7.50). In general terms, the stability of a receiver-converter combination is very nearly that of the receiver used, while the cost of a converter is very much less than that of a separate receiver.

Conclusions

From the foregoing summary of available information and means of getting it, it appears that any resident of North America has available to him from three to more than fifty radio sources of weather information. How many of these he chooses to receive is up to him. Comparison of the information needs with the information locally available will determine just how much equipment he should have.

In most instances and locations, relatively simple and inexpensive radio equipment, carefully used, will produce adequate weather information for most instructional and research use. Only in exceptional cases and only where a highly skilled operator is available is the cost of "advanced" equipment repaid in added information received.

DEVELOPING GEOGRAPHIC CONCEPTS IN THE PRIMARY GRADES*

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IT HAS BEEN STATED that the successfulness of the study of intermediate geography depends to a large extent upon the background the pupils have received in the primary grades. It cannot be left to a haphazard approach or incidental teaching in the primary grades, but it must be well planned and well organized step by step.

So we have endeavoured to make a guide for second grade teachers which we feel, and hope, will help to give boys and girls that necessary background.

I. Objectives

A. To create a scientific attitude.

B. To develop an increasing appreciation of the interrelations and interdependence in the expanding neighborhood.

C. To help the child to become aware of the many wonders of nature that surround us.

D. To increase the ability to observe and interpret everyday experiences more accurately.

E. To encourage the awareness of seasonal change.

F. To perceive relationships of place, sequence, and time.

G. To develop attitudes of ideals that tend to make the child a worthy member of the neighborhood.

H. To develop an understanding of the individual responsibility and the group cooperation needed to make their environment better.

I. To develop the skill in the use of geographic vocabulary.

J. To improve skill in reading as a means of finding useful information.

II. Directions. Concepts and Activities

A. Learn that North, South, East, and West are directions.

1. Teacher could refer to the entrances of the school as North entrance, etc.

2. Label the directions on the walks and on the floor of the room.

3. Tell them Miss Black's room is north of them, the room across the hall is west, etc.

4. Give simple drill exercises.

a. Walk East.

b. Face North and tell what things you see.

5. Give the directions for going home, to the store, and other places in your immediate neighborhood.

6. Make cutout pictures of children pointing to the East, West, North, South.

B. The sun appears to come up in the East and go down in the West.

C. We can tell directions from the sun.

Take the children out at noon on a sunny day and ask them to stand so their shadows are directly in front of them, then tell them they are looking North.

D. Up is away from the center of the earth.

E. Down is toward the center of the earth.

III. Sun. Concepts and Activities

A. The sun is hot and far away.

Use various metal objects. Place some in the sun and some in the shade. Those in the sunlight will feel much warmer to touch than those in the shade.

* Developed in a workshop at Iowa State Teachers College under the direction of Mamie L. Anderzhon.

B. Sun is important to all life.

Use two plants; place one in the sunlight and one in the darkness. The one in the sunlight will grow well, whereas the one in darkness will be stunted.

C. The sun gives the earth light and heat.

D. The amount of heat varies with the time of day and the time of year.

Take the temperature at nine o'clock, noon, and two o'clock each day and record these on a chart. Do this in the different seasons and compare them.

E. The amount of light and heat that we receive from the sun depends upon how high the sun is in the sky. As the sun gets higher in the sky the temperature becomes warmer.

F. When clouds come between us and the sun, some of the sun's light and heat is cut off.

G. Heat from the sun causes water to evaporate faster.

Place two wet cloths on a tree limb. Place one in the shade and one in the sun and notice which one dries faster.

H. The sun appears to rise in the east and set in the west.

I. The shadow is always just opposite the direction of the sun.

Have a child go out early in the morning when the sun is shining and see where his shadow is.

J. The shorter the shadow the higher the sun is in the sky.

K. The longer the shadow the lower the sun is in the sky.

L. Shadows help to tell time.

M. When shadows are shortest it is noon.

1. Take wrapping paper and have a child stand on it out in the sun and draw his shadow at nine o'clock, noon, and two-thirty. Compare them. Write the length of the shadow, the height of the child, the time of day, and the date of the month on it and keep it. You can use these to compare the seasons.

2. Make a shadow stick.

IV. Seasons and Weather. Concepts and Activities

A. There are four seasons--summer, autumn, winter, spring.

B. The weather in each season is different.

1. Dress dolls for the four seasons.

2. Cut from magazines pictures of various outdoor human activities. Draw 4 thermometers on a large chart with temperature representing each season. Paste the cutouts under the correct season.

3. Take pictures of the same place in the four different seasons and compare. (It would be a good idea to have a tree in this picture.)

4. Make an individual study of each season at the appropriate time.

Seasonal changes in Autumn

a. Animals prepare for winter.
   (1) Certain mammals hibernate.
   (2) Some birds migrate.
   Identify the birds that migrate and those that stay.
   (3) Sometimes animals store food.

b. Plants prepare for winter.
   (1) Some plants produce seeds and die.
   (2) Many plants stop growing and are dormant.
   (3) Trees have different adaptations.
   (a) Some trees lose their leaves.
   (b) The leaves of some plants change color.
   (c) The sap goes down.

c. The weather gets colder.

d. The days are getting shorter and the nights are getting longer.

C. We make our plans to a certain extent according to the type of weather we are having.

1. Mother looked out the window and decided we would eat our dinner in the house instead of having a picnic in the park.

2. Play games in which deductions are made regarding behavior influenced by temperature.

D. Thermometer recordings are important in our daily lives.

1. They indicate to us the kind of clothes we are to wear.

Have children note the relationship between the temperature and the kind of clothes they have on.

2. It influences our control of the heat in our house.

3. It tells us when to protect growing plants and animals.

4. The temperature of the air helps us to know whether clouds will bring rain or snow.

E. A thermometer tells us the temperature.

1. Sometimes you say the schoolroom is too hot or too cold but before I ask the custodian to cut down our heat I look at the thermometer.

2. Use a rain gauge to measure the amount of rainfall.

3. Bring snow inside and see how much it takes to make an inch of water.

F. Weather can cause safety hazards.

G. Weather changes can frequently be predicted from the condition of the sky.

H. Different types of clouds accompany different weather conditions.

I. Weather changes may take place rapidly in a given day.

1. Take thermometer readings in the morning, at noon, and at the afternoon recess to get an idea of daily temperature changes.

2. Take thermometer readings during sudden weather changes.

3. Read the story "Old Winter Clothes," pages 128-132 in *Three Friends*, Scott Foresman & Co.

J. Weather combinations vary.

Keep a weather calendar with symbols such as: an umbrella for a rainy day; a sun for a sunny day; clouds for a cloudy day; snowflakes for a snowy day.

K. The weather in each season is different.

Compare the records of the temperature.

V. Wind and Air. Concepts and Activities

A. Wind is air in motion.

Turn on the electric fan.

B. We cannot see the wind, but we can feel it and see the effects of it.

Take a walk on a windy day.

C. Wind may be useful.

Tell the children to notice if their mother's washing dries faster outside on a windy day or a quiet day.

D. Wind makes evaporation take place faster.

Wet two spots at some distance from each other on the blackboard. Fan the air near one of them but not the other one.

E. The wind has force.

F. Man often uses the wind's force to his advantage.

1. It moves sailboats.

2. It blows kites.

3. It makes the windmill go.

G. Wind may become man's enemy.

Ask the children to observe what damage the wind has done after a severe windstorm.

H. The wind is named according to the direction it blows from.

I. The direction the wind is blowing can be determined in different ways.

1. Make a weather vane.

2. Notice the direction the trees are swaying.

3. Notice the direction the smoke is going.

J. Warm air is lighter than cold air; therefore it rises.

Tie two empty paper sacks with the open ends down on a clothes hanger.

Hold a lighted candle a little ways below the open end of one sack.

Suspend the hanger in the middle with a string. The hanger will tip down on the side that the candle isn't held under. (The teacher should do this experiment.)

K. Cold air is heavier than warm air; therefore we find it lower.

Put a thermometer near the floor, leave it for a few minutes and then record the

temperature. Now put it near the ceiling for a few minutes and record the temperature. Compare the two temperatures.

L. We can't see air but it is everywhere.

Invert a tumbler and try pushing it into a pan of water.

VI. Earth: Concepts and Activities

A. The earth is round.

B. Air surrounds the earth.

C. The earth rotates from West to East every 24 hours which gives us day and night.

1. Rotate the globe and hold a flash light straight above it.

2. If you don't have a globe, take a round ball and paint ½ of the ball black and half of the ball white. Then rotate the ball to show this principle.

D. The earth is lighted by the sun.

E. Half of the earth is always light and half is always dark.

F. The lighted half is day and the unlighted part is night.

G. The earth travels around the sun once each year.

H. The earth is made up of soil, rocks, minerals, and water.

VII. Maps: Concepts and Activities

A. Maps stand for a real place.

B. We can find the place where we live on a map.

C. Symbols can stand for places or objects on a map.

D. Map making requires careful and accurate observation.

E. We can make a map of our classroom.

1. Floor plan of the classroom. Symbols for the desks, tables, chairs, teacher's desk, doors, windows, etc. Diagram properly oriented—relative to the room.

2. Floor plan can be drawn in the sand of the playground with sticks.

F. We can make maps for some stories.

G. We can make a map of our block.

1. Take a trip around the school block. Watch for traffic signs and lights, fire hydrants, stop signs, white lines for crossing streets, telephone poles, and types of transportation.

2. Take a walk around the block with the children and count the houses and other buildings that face the streets. Make a map of the block with symbols to represent houses, buildings, and the school.

H. We can make a map of our way to and from school.

Map the way to school by using lines for streets, and picture symbols for some of the buildings along the way.

I. We can make a map of the route to follow to town.

J. We can make a map of our neighborhood.

K. We take a road map with us on a trip.

Provide a flat map of the U.S. to be used to answer questions of places within out own country and encourage the understanding of simple terms and symbols.

VIII. Globes: Concepts and Activities

A. The earth is a huge sphere.

B. The globe is a symbol for our earth showing the land and water.

C. We can find the place where we live on the globe.

Find the place where we live on the globe. Make a flag with a toothpick and paper. Fasten it to the globe with plasticine to show where we live.

D. To show rotation of the earth we turn the globe from west to east.

E. When we talk about people far away, we are talking of places we can locate on the globe.

Whenever a distant place is mentioned in class, have the children find it on the globe.

F. The globe helps us to understand night and day.

G. The place farthest North is the North Pole. (point)

H. The place farthest South is the South Pole. (point)

Find the place which is the farthest North and the farthest South.

I. The equator is midway between the two poles.

With your finger, trace a path around the middle of the globe. Tell the child that this place is called the equator.

J. We can compare distances by using the globe.

IX. Conservation: Concepts and Activities

A. Conservation is important to us.
B. Conservation of soil means using it wisely.
C. People can do things to stop soil from washing or blowing away.
D. After a heavy rain have the children observe the effects of the rain in their playground.
E. Plants can help to hold soil in place.
F. Water has many uses and must not be wasted.
G. Some kinds of wild life should be protected because they have values for man.
H. In cold regions in winter, we should put out food for the birds.
I. People enjoy natural features in the environment.
J. People often help to make their surroundings more beautiful and useful.

Children can keep the playground free from litter; also, they can show respect for people's lawns by using sidewalks.

Visual Aids

Films, 16 mm.

Encyclopaedia Britannica

Autumn on the Farm
Winter on the Farm
Spring on the Farm
Summer on the Farm
Children in Autumn
Children in Spring
Children in Summer
Children in Winter

Coronet

Autumn is an Adventure
Spring is an Adventure
Summer is an Adventure
Winter is an Adventure
The Big Sun and Our Earth
Animals and Their Foods
Animals and Their Homes
How Animals Live in Winter
Lands and Waters of the Earth
Seasons of the Year
Water, Water, Everywhere
Safety in Winter
The Water We Drink
One Rainy Day
Spotty, The Fawn in Winter

Filmstrips

The Earth
Night and Day
The Night Sky
The Seasons
Our Weather

Bibliography

1. Adelson, Leone, *All Ready for Winter,* New York, Oxford Press, 1950.

2. Atwood, Wallace B. and Thomas, Helen Goss, *Neighborhood Stories,* Chicago, Ginn & Co., 1944.

Weather & Clothing, pp. 131, 132.

Our Friend the Sun, pp. 171-173.

3. Baker, Arthur O., Maddux, Grace C., and Warrin, Helen B., *Around the Corner,* Chicago, Rand McNally, 1955.

4. Barnard, Stendler, and Spock, Moffett, *Science, Health, Safety,* New York, Macmillan Co., 1959.

Finding Out about the Weather, pp. 46-47.

5. Bond, Austin, Bond, Guy L., Clymer, Theodore, and Bell, Kate, *Getting Ready,* Chicago, Lyons & Carnahan, 1958.

North, South, pp. 4-12.

Autumn, Winter, pp. 58-90.

6. Bond, Austin, Bond, Guy L., Clymer, Theodore, and Bell, Kate, *Looking at Science,* Chicago, Lyons & Carnahan, 1958.

The Sun and the Stars, pp. 2-23.

Sunshine, Rain, and Snow, pp. 43-58.

Spring Comes, pp. 60-91.

7. Bond, Austin, Bond, Guy L., Cly-

mer, Theodore, and Bell, Kate, *Thinking About Science,* Chicago, Lyons & Carnahan, 1958.

Earth, Sun, Moon, & Stars, pp. 80-97.

Thermometer, pp. 116-120.

Animals in Spring, pp. 155-161.

8. Blough, Glen, *Animals Around the Year* (1955), *Bird in the Big Woods* (1955), *Plants Round the Year* (1955), *Water Appears and Disappears* (1953), and *How the Sun Helps Us* (1960), Evanston, Ill., Row, Peterson.

9. Dowling, Thomas I., Freeman, Kenneth, Lacy, Nan, and Tippett, James S., *The New Seeing Why,* Philadelphia, J. C. Winston, 1957.

Air, Water, Earth, & Sky, pp. 113-125.

The Direction the Wind Blows, pp. 128-135.

The Sky, Moon, and Stars, pp. 137-143.

Other Changes, pp. 144 & 145.

10. Frasier, Geo. W., MacCracken, Helen D., and Decker, Donald G., *Science All the Year,* Syracuse, N.Y., L. W. Singer Co., 1959.

The Earth is Big, pp. 12-16.

The Sun, pp. 17-20.

Other Heavenly Bodies, pp. 27-29.

Stars In the N. Sky, pp. 30-24.

An Autumn Walk, pp. 35-40.

Where Does the Water, pp. 65-68.

Water Comes Out of the Air, pp. 68, 69.

You Can Make Air Do Things, pp. 63, 64.

Weather, pp. 78-81.

Heat, pp. 131-136.

A Spring Walk, pp. 162-164.

11. Frasier, Geo. W., MacCracken, Helen, and Decker, Donald, *We Ask* (pp. 6-33), Chicago, L. W. Singer Co., 1955.

12. Knox, Warren, Stone, George, Meister, Morris, and Noble, Doris, *The Wonderland of Science* (Revised, Bk. 2) Bloomington, Ind., Charles Scribner and Sons, 1957.

Getting Ready for Winter, pp. 39-56.

The Earth, pp. 95-105.

13. Parker, Bertha M., *Fall Is Here, Winter Is Here, Spring Is Here, Summer Is Here, Leaves,* Evanston, Ill., Row, Peterson, 1950.

14. Schneider, Herman and Nina, *Science for Here and Now,* Boston, D. C. Heath, 1955.

Fall Brings Changes, pp. 29-42.

Winter Brings Changes, pp. 101-112.

A Thermometer, pp. 113-122.

Weather, pp. 131-148.

15. Schneider, Herman and Nina, *Science for Work & Play,* Boston, D. C. Heath, 1955.

The Seasons, pp. 64-73.

16. Smith, Victor, and Clarke, Katherine, *Science Under the Sun,* Chicago, J. B. Lippincott, 1956.

Tom and Sue Learn the Earth is Big, pp. 94-114.

17. Thorn, Samuel A., and Harbeck, Irene, *Let's Look Around,* Chicago, Benefic Press, 1957.

The Thermometer, pp. 31-34.

Winter Is Coming, pp. 45-50.

Summer Fun, pp. 153-157.

18. Thurber, Walter A., *Exploring Science 2,* Chicago, Allyn & Bacon, Inc., 1960.

Watching the Sky, pp. 20-25.

The Pull of the Earth, p. 49.

Other Books

1. Black, Marjorie, *The Restless Robin,* Boston, Houghton Mifflin, 1937.

2. Bronson, Wilfred S., *Turtles,* New York, Harcourt Brace, 1945.

3. Earle, Olive L., *Robins in the Garden,* New York, Wm. Morrow, 1953.

4. Goudey, Alice E., *The Good Rain,* New York, Aladdin's Books, 1950.

5. Lewellen, John, *The True Book of the Sun, Moon and Stars,* Chicago, Children's Press, 1954.

6. Parker, Bertha, *Thermometers, Heat and Cold,* Evanston, Ill., Row, Peterson, 1942.

7. Schneider, Herman and Nina, *Follow the Sunset,* New York, Doubleday, 1952.

8. Schneider, Herman and Nina, *You Among the Stars,* New York, Wm. R. Scott, 1951.

9. Tannerhill, Ivan Ray, *All About the Weather, New York,* Random House. 1953.

10. Tresselt, Alvin R., *Follow the Wind,* New York, Lee & Sheppard, 1950.

11. Tresselt, Alvin, *White Snow, Bright Snow,* New York, Lathrop, 1947.

12. Wyler, Rose, *My Little Golden Book About the Sky,* New York, Simon & Schuster, 1956.

13. Zim, Herbert S., *The Sun,* New York, Wm. Morrow, 1953.

14. Zion, Gene, *Really Spring,* New York, Harpers, 1956.

15. Zolotow, Charlotte, *The Storm Book,* New York, Harpers, 1952.

THE NATIONAL COUNCIL AT WORK

NCGE LOOKS AHEAD—THE REPORT OF THE PLANNING COMMITTEE

The Planning Committee of the National Council for Geographic Education feels that geography and geographers stand on the threshold of a period of tremendous challenge and opportunity. Probably never before in the history of American education have so many educators and laymen looked at our field with such genuine interest and expectation. In view of the current atmosphere, the Planning Commmittee deems it appropriate to share their recommendations for 1961 with all of the readers of THE JOURNAL OF GEOGRAPHY. Readers' comments and suggestions are welcomed.

1. The Planning Committee recommends that the Publications Center actively continue its program of publication in geographic education. To implement the services of the center, it is recommended that an analysis be made of teacher needs in the area of geographic education so that future publication plans will assure a continued flow of materials needed to aid in the improvement of geography instruction. It is further recommended, to assure a unified program, that all activities related to publications be directed by the NCGE *Publications Committee.*
2. The Planning Committee recommends that NCGE thoroughly investigate the possibilities offered in the revolutionary new media of communication for instruction in geography at all levels. NCGE should encourage new projects which will promote experimentation leading to evaluation in the use of these new media to determine their applicability to geographic instruction.
3. The Planning Committee recommends that NCGE annually present certificates of recognition to outstanding college senior students of geography. The students selected for these awards will be designated by college and university departments offering a geography major. It is hoped that through this recognition young geographers will, early in their careers, become identified with the work of NCGE.
4. The Planning Committee recommends that NCGE investigate the possibility of holding special NCGE sessions concerned with the teaching of geography at the divisional meetings of the Association of American Geographers. It is further recommended that NCGE investigate the possibility of holding joint meetings, or that the Council sponsor special sessions related to the teaching of geography, with other national organizations concerned with the curriculum improvement.
5. The Planning Committee recommends that NCGE more actively encourage and promote significant research in geographic education through giving further publicity to the availability of the research funds of the Council.
6. The Planning Committee recommends that a committee be appointed to study the role that NCGE can play in the planning and teaching of the many new local and state programs in secondary school earth science.
7. The Planning Committee recommends that a *National Membership Committee,* consisting of the Secretary, the Director of Coordinators, and the Chairman of the *Publications Committee* be established as a policy making committee to effect a major drive for increasing membership in in NCGE.
8. The Planning Committee recommends that a *Placement Committee* be established to act as a coordinating agency between public school systems seeking personnel to teach or to supervise courses in geography and teachers trained in geography who may be seeking such positions.

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Chairman
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New York 27, New York

GEOGRAPHIC MATERIALS RECEIVED

Ernle Bradford. **A Wind From the North: The Life of Henry the Navigator.** Harcourt, Brace and Company, 750 Third Avenue, New York 17, New York, 1960. 269 pages including chronology, list of sources, notes, plus index. $5.00.

Gerald Gottlieb. **The First Book of the Mediterranean.** Franklin Watts, Inc., 575 Lexington Avenue, New York 22, New York, 1960. 60 pages including illustrations, map, table of contents, index. $1.95.

Arthur H. Carhart. **The National Forests.** Alfred A. Knope, 501 Madison Avenue, New York 22, New York, 1959. 289 pages including illustrations, map, table of contents, appendix, plus index. $4.75.

S. H. Steinberg, editor. **The Statesman's Year-Book: 1960-61.** St. Martin's Press, 175 Fifth Avenue, New York 10, New York, 1960. 1677 pages including table of contents, addenda, comparative statistical tables, index, maps. $9.50.

The American Imagination. American Education Publications, Wesleyan University, Middletown, Connecticut, 1960. 210 pages including table of contents.

T. H. Elkins. **Germany.** Christophers Publishers LTD, 40-42 William IV Street, London WC2, England, 1960. 272 pages including table of contents, maps, diagrams, index. Price 12s 6d non net.

George H. T. Kimble. **Tropical Africa: Land and Livelihood.** The Twentieth Century Fund, 41 East 70 Street, New York 21, New York, 1960. 603 pages including table of contents, tables, illustrations, maps. $15.00 in two volumes.

George H. T. Kimble. **Tropical Africa: Society and Polity.** The Twentieth Century Fund, 41 East 70 Street, New York 21, New York, 1960. 506 pages including table of contents, index, tables, illustrations. $15.00 in two volumes.

Teaching Map and Globe Skills. Board of Education of the City of New York, Bureau of Curriculum Research, 130 West 55th Street, New York 19, New York, 1960. 41 pages including table of contents, appendix, acknowledgments. $.50.

Teaching about the United Nations. United States Government Printing Office, Washington 25, D.C., 1960. 96 pages including table of contents, appendix, photograph. $.45.

Charles R. Joy. **Getting to Know the Two Chinas.** Coward-McCann, Inc., 210 Madison Avenue, New York, New York, 1960. 65 pages including illustrations, map, pronunciation dictionary, simple Chinese phrases, history, index. $2.50. Ages 8-12.

Griffith Taylor, editor. **Geography in the Twentieth Century.** Philosophical Library, Inc., 15 East 40th Street, New York 16, New York, 1960. 674 pages including table of contents, maps and diagrams, plates, glossary of geographical terms, index. $10.00.

Robert Steelman. **Call of the Arctic.** Coward-McCann, Inc., 210 Madison Avenue, New York, New York, 1960. 316 pages. $5.00.

L. Dudley Stamp. **A Regional Geography** (for Advanced and Scholarship Courses), **Part V Europe and the Mediterranean.** Longmans, Green & Company, 119 W. Fortieth Street, New York 18, New York, 1960. 336 pages including maps and diagrams, examination questions, and index. $4.75.

Lorus J. Milne and Margery Milne. **The Balance of Nature.** Alfred A. Knopf, 501 Madison Avenue, New York 22, New York, 1960. 329 pages including table of contents, notes, plus index and a note of the authors. $5.00.

Japan: A Packet for Teachers. Information Office, Consulate General of Japan, 3 East 54th Street, New York 22, New York, 1960.

Subcommittee of the Pennsylvania Earth and Space Science Course Advisory Committee. **Teaching Guide for the Earth and Space Science Course.** National Aviation Education Council, 1025 Connecticut Avenue, N.W., Washington 6, D.C., 1960. 103 pages including a table of contents, background for the teacher, appendix, bibliography, illustrations. $1.00.

Simon Kuznets, Ann Ratner Miller, and Richard A. Easterlin. **Population Redistribution and Economic Growth: United States, 1870-1950 II Analyses of Economic Change.** The American Philosophical Society, 104 South Fifth Street, Philadelphia 6, Pennsylvania, 1960. 289 pages including table of contents, appendix, charts, map, errors in Vol. I. $5.00.

Philip L. Wagner. **The Human Use of the Earth.** The Free Press, Glencoe, Illinois, 1960. 270 pages including maps, graphs, table of contents, notes, and index. $6.00.

Dorothy Loder. **The Key to Philadelphia.** J. B. Lippincott Company, East Washington Square, Philadelphia 5, Pennsylvania, 1960. 120 pages with picture illustrations, map, table of contents, and index. $2.75.

Alice Fleming. **The Key to New York.** J. B. Lippincott Company, East Washington Square, Philadelphia 5, Pennsylvania, 1960. 128 pages with picture illustrations, map, table of contents, and index. $2.75.

Alicia Street. **The Key to London.** J. B. Lippincott Company, East Washington Square, Philadelphia 5, Pennsylvania, 1960. 121 pages with picture illustrations, map, table of contents, and index. $2.75.

E. H. Bunbury. **A History of Ancient Geography.** Dover Publications, Inc., 180 Varick Street, New York 14, New York, 1959. Vol. I. 666 pages with maps, notes, footnotes, table of contents. $12.50.

E. H. Bunbury. **A History of Ancient Geography.** Dover Publications, Inc., 180 Varick Street, New York 14, New York, 1959. Vol. II. 741 pages with table of contents, list of maps, notes, and index. $12.50.

Air Attack on Forest Fires. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C., 1960. 32 pages illustrated with table of contents. 30¢.

Gilbert J. Butland. **Latin America: A Regional Geography.** Longmans, Green & Company, Inc., 119 West 40th Street, New York 18, New York, 1960. 373 pages complete with table of contents, index, glossary, references, picture illustrations, and maps. $5.50.

John and Jane Greverus Perry. **Exploring the River.** Whittlesey House, McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, New York, 1960. 203 pages with table of contents, index, map, and illustrations. $3.50.

Margaret O. Hyde. **Animal Clocks and Compasses.** Whittlesey House, McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, New York, 1960. 157 pages with table of contents, bibliography, index, maps, and illustrations. $2.95.

BOOK REVIEWS

Bern Anderson. **Surveyor of the Sea** (The Life and Voyages of Captain George Vancouver). University of Washington Press, Seattle, 1960. 274 pp. illustrations and maps.

The broad expanse of the Pacific Ocean, across which in history prior to the mid-nineteenth century there had sailed sealers, whalers, entrepreneurs, the best of the navies of the principal sea-faring nations of the world, and scientific exploring expeditions, was delineated on maps and described in texts with many notable inaccuracies. During the second half of the eighteenth century and the first half of the nineteenth century the English particularly searched out and delineated the broad general outline of the Pacific and its many island groups and atolls. Captains James Cook and George Vancouver, with their high standards of accuracy in topographic description and their high professional competencies as navigators were responsible for much of the re-making of the map of the Pacific Ocean in the Eighteenth century.

Unfortunately, Captain George Vancouver's great contributions appear to have been overshadowed by the more spectacular and wide-ranging activities of Captain James Cook. Admiral Bern Anderson, as Vancouver's modern biographer in his *Surveyor of the Sea*, has contributed much to our better understanding of him as a man, a diplomat, and especially as a well-qualified topographer-surveyor. This book is essentially a biography but it is also a description of some of the most notable geographical discoveries and cartographic presentations of modern times. Admiral Anderson interestingly traces the highlights of Vancouver's life from his apprenticeship at fourteen with Captain Cook (1757-1780) to his own expedition in 1790-1795 when he commanded ". . . one of the most notable voyages in the annals of navigation," a survey of the Pacific coastline. The *Atlas* that was prepared to show the cartographic results of this expedition is one of the most exquisite and painstakingly accurate products of its kind. Anderson describes these field operations with clear understanding based on his own wealth of experience in this profession.

This biography is well-written, has the professional touch of a biographer at home in his native field, and compacts into one volume much information about Vancouver that has generally not been readily available. This reviewer is surprised, however, to find that the maps of Vancouver's explorations included in this book are present-day draftsman's redrawing of Vancouver's maps. Though these maps are well drawn, it seems to me that it would have been so much more to the point and do justice to Vancouver's competencies to have reproduced exactly selections of the remarkable maps in his *Atlas*. This is particularly true because the biography does deal with the Surveyor of the Sea and mapping is a primary product thereof.

To all of us who have an interest in biography, in geographical exploration, and in the history of the Pacific Basin, Admiral Anderson's book is an indispensable source and a ready reference.

HERMAN R. FRIIS

The National Archives
Washington, D.C.

George Kish. **Economic Atlas of the Soviet Union.** The University of Michigan Press, Ann Arbor, 1960.

The *Economic Atlas of the Soviet Union* primarily consists of maps depicting the economy of 15 major regions. Each of these regions is surveyed by four maps which are devoted to agriculture and land use, transportation and cities, mining, and industry. Each set of regional maps is accompanied by a one-page summary of salient geographic features. By contrast, the only distributional patterns portrayed on a national scale are those representing terrain, vegetation, administrative divisions, air transportation, and the distribution of population.

Inadequate nation-wide coverage is perhaps the greatest deficiency of the *Economic Atlas of the Soviet Union*. But the usefulness of this atlas is also diminished by other shortcomings. One of these is the failure to tap Soviet statistical data, contrary to the claim on the atlas jacket. The only statistically based may is the oversimplified map of population density. Regional coverage could also have been enhanced by the utilization of additional descriptive sources. For example, railroads are not differentiated by their

number of tracks, gauge, or type of traction (electric, Diesel-electric, steam), even though this information is available in Russian sources. Among other weaknesses are unwieldy symbols on the industry maps, inaccuracies in pipeline patterns, and an occasionally misleading text.

Nonetheless, this atlas should be in every school library because it is the only current atlas in English pertaining to Soviet economic regions. Whether the merits of this work justify a ten-dollar investment by the individual scholar is considerably less certain.

ROBERT TAAFFE

Indiana University

Frances C. Smith. **The World of the Arctic.** J. B. Lippincott Company, East Washington Square, Philadelphia 5, Pennsylvania, 1960. 126 pages with photographs, index and table of contents. $2.95.

This little book is in the same format as Lippincott's "Portraits of the Nations" series. It gives young people a survey of the arctic regions which is marred only occasionally by inaccuracy or misplaced emphasis. As a whole, it captures quite well the look, feel, color, and movement of the circumpolar lands.

The reader will be disappointed when examining the frontispiece map (unfortunately this is the only map in the book) to find that the locations of Verkhoyansk and Vorkuta have been transposed. His confidence will be further shaken when he reads on the first page that "The word Arctic itself implies north. It is derived from the name of the star Arcturus in the Bear, one of the constellations which circle the sky in the north polar region." A good unabridged dictionary or astronomy text could have set the author right on this matter. One would wish also that the author had made use of more recent authorities on some regions: for example, repeating Peary's description of Pearyland as a desolate waste rather than depending upon Koch, Fristrup, or other recent Danish workers.

However, these discrepancies are more annoying than fatal.

Some of the most perceptive parts of the book are the chapters dealing with the Eskimo culture, and those dealing with plant, animal and bird life. These sections reconstruct vividly the physical environment and human responses in a region where this interrelationship has been unusually vigorous.

Since the first merchant trading companies began their expensive and difficult searches for the Northeast and Northwest passages in the 16th century, man has known that the shortest routes between East and West should lie through the Arctic. However, only in the last forty years have the airplane and the atomic submarine provided the means for utilizing these routes. In spite of political tensions, or perhaps because of them, intensified scientific investigations are now bringing 16th century dreams to fruition. This book will introduce the young reader to a region which now, and for some time in the future is and will be worthy of close attention.

THOMAS M. GRIFFITHS

University of Denver

George B. Cressey. **Crossroads: Land and Life in Southwest Asia.** J. B. Lippincott Company, Chicago, 1960. 595 pages, ill. $8.95.

This fine addition to the list of college textbooks and reference books is a credit to both the author and the publishers. It is far superior to any other single information source on the area. The appearance of the book is attractive with an abundance of illustrations and maps including a political map in color of the area. Southwest Asia includes the region from Egypt to Afghanistan from the Black Sea and USSR on the north to the Arabian Sea and Indian Ocean on the south.

The book is divided into two parts. Part One, in nine chapters, covers the over-all approach with chapters on: personality of the regional culture, people, geology and land forms, climate, rivers, land use, mineral resources, oil, and international contacts. These chapters provide the background for the regional political studies which follow. Part Two, consists of a regional analysis in eight chapters. Titles of these chapters are: Turkey, Arabia, Egypt, Iraq, The Levant (Syria, Lebanon, Jordan), Israel, Iran, and Afghanistan. The book contains a total of nearly 60 maps and 85 tables which both add greatly to its usefulness as a textbook and reference work. There is a glossary of unfamiliar words and a satisfactory index.

Crossroads briefly discusses the political problems of the countries, their international relationships, and nationalistic aspirations. Emphasis is given to the culture of the people, the pattern of distribution of the inhabitants, the economy of the region, and its political subdivisions. The book adequately covers its subtitle "Land and Life in Southwest Asia" and is a timely and useful volume. It is recommended for use by students and others interested who will find it contains accurate information presented in an interesting style.

OTIS W. FREEMAN

Seattle, Washington

Peter Matthiessen. **Wildlife In America.** The Viking Press, New York, 1959. XII and 295 pages, including over 100 line drawings, color and monochrome plates, maps, and two appendices; one of the appendices deals with rare, declining, and extinct vertebrate animal species; the other, a chronology of representative legislation affecting North American Wildlife. Hand cover, $10.00.

This book should delight the conservationists, zoologists, the general reader, as well as the nature lover. But more important, it should prove to be a major source book for geographers at all levels. Using a regional and chronological

approach, the author starts with the "Outlying Rocks" of the east coast and the "Tropical Border" (these are Chapters 1 and 2, incidentally) and proceeds inland westward through "Fur Countries and Forest Lakes" across the "Plains, Prairies, and Shining Mountains" to the "Land of the North Wind" and "Another Heaven and Another Earth." The teacher will be gratified by the care taken to locate in regions the wildlife of the past and present. She will see man as a "predator" and a "catalyst", will be able to acquaint her students with extinct creatures as well as with the changed and changing groups of wild creatures today.

The book may be read for sheer delight. Intriguing chapters on Hidden Worlds, Wilderness Road, and Old Fields make extremely pleasant reading. The profusion of sketches—birds, fish, and animals—plus the beautiful Audubon Plates lend artistic taste to the book.

Finally, the tragic stories of destroyed wild life sobers the reader and, if such readers are students, should give them new, more meaningful perspective on that which is around them now and that which is to come.

While the price seems high for mass purchases, every library should have a copy—and that copy made readily available for students, teachers, and the general public.

HENRY J. WARMAN

Clark University

C. F. Beckingham, introduction. **Atlas of the Arab World and the Middle East.** Macmillan & Company, 60 Fifth Avenue, New York 11, New York, 1960. 234 pages including table of contents and index. $9.00.

With the growing interest and well established importance of the Arab World and the Middle East, an Atlas such as this will be welcomed not only by those primarily concerned with Middle Eastern affairs and geography, but also by the interested layman and student.

The **Atlas** contains 39 pages of maps plus end papers that cover the major aspects of physical, cultural, and economic geography of North Africa and the Middle East. Land forms, precipitation, winds and rainfall, vegetation, and distribution of mineral resources are among the physical features depicted; land use, population, ethnic origin, transportation, city plans, and political changes represent cultural aspects. The end papers show the spread of Islam in the 20th Century and the Islamic world in the Middle Ages.

Following the **Atlas** proper are 16 pages of text and photographs. The text material gives a brief but highly readable introduction to the geography and history of the areas included in the **Atlas.** The photographs covering various scenes of the land and life are excellent and give one a good idea of the complexity of the region.

It is the opinion of the reviewer that the **Atlas** achieves well its objective of presenting by maps that are clear and readable the complex features of a very large region. The specialist could criticize some omissions and lack of detail, but the **Atlas** obviously was not designed for this group, rather for the interested student and layman. These will find it of much value.

JOHN R. RANDALL

The Ohio State University

Charles H. Hapgood. **Great Mysteries of the Earth.** G. P. Putnam's Sons, 210 Madison Avenue, New York, 1960. 72 pages with table of contents. Illustrated by Robert Eggers. $2.75. Ages: 8-12.

Great Mysteries of the Earth is an exceptionally interesting book intended for children whose ages range from 8 to 12. The book covers such "mysteries" as origins of the earth, causes of the ice ages, and compositions of the earth's interior. Each of the nine chapters include a different problem which has been carefully selected and well developed. The book is written in an exceedingly interesting manner; however, it is more readable for ages 12 to 16 than the 8 to 12 age group for which the book was intended. Both the language and the maturity of critical reasoning are too advanced for most children of the intermediate grades but well suited for the majority of junior high school readers.

The illustrations are numerous but many are without captions, and some are not clearly understood by the younger age group. The book is without a bibliography, an index, and footnotes. The principal asset of **Great Mysteries of the Earth** is the inquiring manner in which a few of the more fascinating questions about our earth are analyzed. The nine questions selected are ones which, to date, have been unanswerable. The book establishes an objective-problem approach to critical thinking about these questions, and, indeed, may stimulate the interest of young potential scientists to help solve some of them in the future.

LEE GUERNSEY

Indiana State Teachers College

J. M. Smythe and C. G. Brown. **Elements of Geography.** St. Martin's Press Incorporated, New York, 1959. 274 pages.

This is a very short treatment of the traditional elements of geography. It was prepared for students in the middle years of Canadian high schools and its stated purpose is to provide an essential foundation upon which detailed studies in the field of regional geography can be built.

The first three sections of the book which deal with the Earth as a Planet, Surface Features, the Elements of Weather and Climate, Natural Vegetation, and Soils occupy 128 of the 274 pages of text. Section 4, in which 15 climatic regions are used as a basis for the study of man's activities, has 67 pages. The part on Economic Geography consists of 60 pages and the final 14 pages cover Population.

The book is so brief that in many places it is little more than a skeletal outline. Topics such as rocks and minerals, weathering, temperature, natural vegetation, and density of population occupy two pages or less of text. Although short, the written presentation is generally clear and concise. Little attempt has been made to make the material interesting and there is a great emphasis upon terminology. There are a large number of diagrams and maps which, although simple, are well-executed and add much to what has been written.

Since the book was designed for Canadian secondary schools, a large number of the illustrative examples are taken from features in that country. Although the book will probably have few adoptions in the United States, teaching college geography courses would be much more satisfactory if our students had been exposed to it.

ROSS N. PEARSON
The University of Michigan

Oxford Regional Economic Atlas: The Middle East and North Africa. Oxford University Press, 417 Fifth Avenue, New York 16, New York, 1960. Paperbound $5.95 or clothbound $10.00.

This volume contains:

(1) Seven general reference maps with comparatively large scale for Morocco, Algeria, Tunisia; The Middle East; Turkey and Syria; the Persian Gulf; the Red Sea; Israel and Lower Egypt; and Somaliland. These maps cover boundaries international, indefinite and provincial; railways, completed, under construction and projected; airfields; pipelines; rivers; canals; and roads.

(2) Twenty-eight topic maps of the whole region dealing with the physical geography; agricultural production (1954); distribution and production of minerals, oil (1957), coal, iron and steel; centers of the leading industries, textile, food, tobacco, chemicals, glass and paper; communications, air, railways and ports (1958); Suez Canal and world shipping (1955); population distribution; and the possession of the European power and the Ottoman Empire in 1880.

(3) Fifty-five pages of supplementary notes and statistics (up to 1956) on twenty three countries. These pages cover: (a) Agriculture, production of major crops and cash crops, tractors and trends. (b) Minerals other than oil. (c) Oil, production of crude oil, estimated oil reserves, outputs of major refineries, marketing and transport, and concessions. (d) Industry and electric power. (e) Transportation facilities. (f) Population, trends, resources, distribution, density, and the Palestenian refugees. (g) Development schemes. (h) Foreign trade, value and direction.

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LAND OF THE 500 MILLION:
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By GEORGE B. CRESSEY, Syracuse University. 410 pages, Text Edition $8.50

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ness of the way the data is represented on the maps make this volume, in the reviewer's thinking, an indispensable tool for geographers, economists, and students of the region.

GIRGIS GHOBRIAL
State University of New York
College of Education, Oswego

Gines M. Maiques. **Life in Europe: Spain.** The Fideler Company, Grand Rapids 2, Michigan, 1959. 160 pages with pictures, glossary, note to teacher, table of contents, and index. 1-4 copies of one title $3.28; 5 or more copies of one title $2.46.

The "Life in Europe" series attempts to portray the geographical, historical, and socio-cultural aspects of European countries in a concentrated and simple form so that it may be used in one of those rather hybrid "social studies" courses.

The volume on Spain contains 16 chapters which deal with a great variety of subject matter ranging from the physical characteristics of the Spanish landscape to the people and their activities and to early and modern history of the nation. In a prevailingly narrative style the author leads us through the countryside, to villages and cities, to all kinds of holiday affairs —not unjustifiedly a whole chapter deals with "fiestas." There is no doubt that the Spanish atmosphere is well caught in the text and this impression is enhanced by the many superb and well-chosen photographs.

Solid geography occupies a relatively small place, but what there is of it is competently presented. A few items could have been stated more clearly—Spain does not have tropical fruits, the winters along the Mediterranean are not only mild but rainy (to bring out the basic characteristic of Mediterranean climate), the map on page 78 makes Spain look like a highly industrialized country because the map symbols are too large. It might be questioned whether the use of small scale dot maps covering most of Europe corresponds to the interpretational level of the pupils. Large scale land use maps of, let us say, a "huerta" and a "meseta" farm area might well be used by teachers in order to "blow up the dots."

All in all the volume is neat, the material is well organized for the young readers and will undoubtedly stimulate their interest in one of the most fascinating countries of Europe.

DIETER BRUNNSCHWEILER
Michigan State University

Frank H. Forrester. **Exploring the Air Ocean.** G. P. Putnam's Sons, New York, 1960. 70 pages. $2.75. This is the sixth book in the Science Explorer Series.

This attractive little volume should hold the interest of children eight to twelve years of age who are intrigued by the study of the atmosphere, balloons, rockets, radiosondes, weather instruments, present-day air activities, and future space conquests. Most laymen also will find value in the book.

The title of the book belies the fact that it is essentially a brief history of weather science and its advancements from antiquity to the present with a glimpse into the future. The contents of the book may be divided into several chief divisions (not chapters as such): ancient wizardry in attempted weather control; early scientific progress in explaining and forecasting the weather; meteorological instruments and measuring the atmospheric elements at various levels in the troposphere; present-day weather mapping and techniques; modern weather control, including man-made weather, especially precipitation; and space age weather with a forward look. The first three chapters are chiefly historical; the remaining three are devoted mainly to present and future weather activities.

The drawings by Robert Eggers (on almost every page) add zest to the book.

GEORGE C. DE LONG
Eastern Michigan University

Norman J. G. Pounds. **The Geography of Iron and Steel.** Hutchinson & Company, London, England, 1959. 192 pages.

In this study, the author has assembled data

Mention the JOURNAL—It Assures Service

from a wide array of source materials to prepare a concise, yet comprehensive, view of the iron and steel industries of the world.

Chapter I is an excellent and concise history of steel development citing the earliest known records together with a lucid description of the evolution of the processes of iron reducation and steel making. It would have added to the value of the chapter if the author had included a more extended description of the oxygen process of steel production which was recently introduced but of significant importance.

Chapter II on ores of iron follows in a condensed form the usual pattern of ore and orebody description found in the standard textbooks in geology and mining engineering. A description of iron ore reserves (in the major countries with brief comments) is largely a condensation and summation of several recent reports on reserves.

Chapter III on modern iron and steel works makes it abundantly clear what the problems are in establishing a modern industry and the formidable difficulties encountered in attempting to build an iron industry in so-called underdeveloped lands.

The problem of coking coal is inadequately treated relative to its critical importance in the industry. Chapters IV and VIII describe the development and present status of the iron and steel industries in the United Kingdom, Canada, Western Europe, the United States, the Soviet sphere, and the underdeveloped countries. On page 90 on United Kingdom the author calls attention to the extensiveness of ore imports. It would have been realistic to compare tonnages of contained iron in these ores.

This study will serve as a useful reference work for all who do not have available the multitude of reports extant on the iron and steel industry.

W. H. VOSKUIL

University of Nevada

E. Joseph Dreany. **The Magic of Rubber.** G. P. Putnam's Sons, 210 Madison Avenue, New York, 1960. 95 pages with index, illustrations, table of contents, acknowledgments, and glossary. $2.75.

Although this book is designed for children of ages eight through twelve, this reviewer doubts that the book could be read and understood by third and fourth grade pupils. There is no doubt that information contained in the book would appeal to students at the junior and senior high school levels.

The eight chapters are short and have eye-appealing titles such as: "Erasers and Rockets"; "The Milkman of Sumatra"; "Rubber's Past"; "Mr. Goodyear's Rolling Pin"; "A World on Wheels"; and "Out of a Test Tube."

The book is profusely illustrated with 33 black and white sketches—nine of which are of double page size. All of the sketches were drawn by the author and executed with the skill of an

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artist. They were carefully selected for interest and supporting of textural matter and add to the attractiveness and value of the book.

There is a short but useful glossary preceding the index, but there is no general bibliography. Instead, the author acknowledges helpful research materials provided by the U.S. Rubber Company in New York City, the Firestone Tire and Rubber Company, and the General Tire and Rubber Company of Akron, Ohio.

The main defect of the book is the so-called world maps (identical) in the front and back of the book. They are an artists conception of the world rather than a named projection with meridians and parallels, scale, and legend. The distribution of the world's natural rubber supply is represented by a sketch of two rubber trees (one in Brazil and a taller one in the Belgian Congo) and two rubber gatherers, one in Nigeria and one off the coast of southeast Asia. This does not give a true picture of the major producing areas of natural rubber.

In spite of minor shortcomings as mentioned above, this interesting little book contains much of value and could be of considerable use as supplementary reading material in geography classes mentioned in this review.

The size of type, format, and quality of paper are excellent.

EDNA M. GUEFFROY
Illinois State Normal University
Normal, Illinois

Mary Foley Horkheimer, John W. Diffor, John Guy Folkes. **Educators Guide to Free Films.** Educators Progress Service, Box 497, Randolph, Wisconsin. 639 pages with index. $9.00.

The Twentieth Edition of the Educators Guide is an up-to-date, well organized and systematized volume listing free audio-visual materials available to teachers. Audio-visual programs in schools have been greatly expanded during the past two decades, and the Guide during its twenty years of existence has kept pace by its acceptance and demand by both film distributors and film-users. There is no question that audio-visual materials have greatly aided the process of education at all levels, thus the Guide makes it possible for all teachers to easily tap this rich source of material. The Guide is revised each year and is designed to provide the most comprehensive information service possible on currently available free films.

The 1960 edition of the **Educators Guide to Free Films** contains 4,267 film titles, and of this number 591 are new to this edition. All new films are starred. Moreover, the authors have maintained a high quality of film selection which has resulted in the withdrawal of 538 films from the previous edition. The Guide is well organized and is simple to use. It contains a table of contents and film listings by areas of the curriculum. Moreover, the Guide is cross indexed for easy reference to related fields as well as containing a title and subject index. In addition to describing the film, the Guide contains information relative to various films by indicating the terms and conditions of film loans, film availability, and, of course, addresses.

Finally, the Guide also contains a sample letter which can be used as a guide by teachers in requesting films from various sources. The Guide is truly a definitive piece of work relative to the availability of free films, and it should be found in every school system throughout the country.

ARTHUR W. WATTERSON
Illinois State Normal University
Normal, Illinois

L. Dudley Stamp and S. Carter Gilmour. **Chisholm's Handbook of Commercial Geography.** Sixteenth Edition. Longmans, Green and Company, 119 W. 40th St., New York, 1960. 915 pages with statistical tables and index. $16.50.

Chisholm's Handbook first appeared on the British market in 1889 and has appeared in 16 editions and 28 printings. This reference work, found on the shelves of all British geographers, has also had wide distribution among British officials and businessmen. The present edition includes 122 pages on general principles and facts underlying commercial geography, 189 pages on a world survey of commodity production, and 563 pages on regional commercial geography. Concise in style, lacking photographs, and equipped with a minimum of maps, it is packed with well selected information.

The 27 pages on the United States illustrate the points which strike a British geographer as significant. For example: "The major industrial regions have grown up for the most part away from the coal fields" (p. 762); "Most American towns have owed their origin to commercial advantages. . . . In many of them the chief industry is the work of distribution." (p. 769); "Over much of the United States climatic conditions are severe and there has been a marked tendency for people to retire or spend long vacations in the most favored states, notably California and Florida." (p. 772)

Although, except for its introductory section, it is too encyclopedic for lengthy reading, the Handbook is an ideal source for brief data on commodities such as pepper, species, frankincense, and others not discussed in most geography texts. Furthermore, its sections on political units such as Dahomey, Fiji, and Guatemala are excellent characterizations. For most teachers the price is too high; however, the book would be a worthwhile reference work in school libraries.

OTIS P. STARKEY
Indiana University

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